NOTICE OF OFFICE OF MANAGEMENT AND BUDGET ACTION

Diana Hynek 12/30/2005
Departmental Paperwork Clearance Officer
Office of the Chief Information Officer
14th and Constitution Ave. NW.
Room 6625
Washington, DC 20230

In accordance with the Paperwork Reduction Act, OMB has taken the following action on your request for approval of a new information collection received on 08/30/2005.

TITLE: Pacific Islands Region Seabird-Fisheries Side-setting Survey

AGENCY FORM NUMBER(S): None

ACTION : APPROVED WITHOUT CHANGE
OMB NO.: 0648-0533
EXPIRATION DATE: 12/31/2008

BURDEN:	RESPONSES	HOURS	COSTS($,000)
Previous	0	0	0
New	24	12	0
Difference	24	12	0
Program Change		12	0
Adjustment		0	0

TERMS OF CLEARANCE: None

OMB Authorizing Official	Title
Donald R. Arbuckle	Deputy Administrator, Office of Information and Regulatory Affairs

PAPERWORK REDUCTION ACT SUBMISSION

Please read the instructions before completing this form. For additional forms or assistance in completing this form, contact your agency's Paperwork Clearance Officer. Send two copies of this form, the collection instrument to be reviewed, the supporting statement, and any additional documentation to: Office of Information and Regulatory Affairs, Office of Management and Budget, Docket Library, Room 10102, 725 17th Street NW, Washington, DC 20503.

1. Agency/Subagency originating request
DOC/NOAA/NMFS/PIR

2. OMB control number
a. 0648 - ______
b. [✔] None

3. Type of information collection (*check one*)
a. [✔] New Collection
b. [ ] Revision of a currently approved collection
c. [ ] Extension of a currently approved collection
d. [ ] Reinstatement, without change, of a previously approved collection for which approval has expired
e. [ ] Reinstatement, with change, of a previously approved collection for which approval has expired
f. [ ] Existing collection in use without an OMB control number

For b-f, note Item A2 of Supporting Statement instructions

4. Type of review requested (*check one*)
a. [✔] Regular submission
b. [ ] Emergency - Approval requested by ___/___/___
c. [ ] Delegated

5. Small entities
Will this information collection have a significant economic impact on a substantial number of small entities? [ ] Yes [✔] No

6. Requested expiration date
a. [✔] Three years from approval date b. [ ] Other Specify: ___/___

7. Title Pacific Islands Region Seabird-Fisheries Side-setting Survey

8. Agency form number(s) (*if applicable*)

9. Keywords "Fisheries," "Fishing" and "Fishing Vessels"

10. Abstract

The Western Pacific Fishery Management Council is proposing mitigation measures to reduce interactions between seabirds and the Hawaii-based pelagic longline fishery, by requiring longline vessel operators to use either side-setting (setting the longline fishing gear from the side of the vessel rather than the stern) or the current suite of seabird mitigation measures, plus tori lines. Although side-setting shows to be the most promising mitigation technique in terms of effectiveness, additional information is needed. Vessel operators currently voluntarily side-setting will be asked to provide data on the operational benefits of side-setting as well as the effectiveness of side-setting as a seabird deterrent. This collection of information is intended to provide NMFS with information as to the cost, availability of equipment, and operational use of equipment, required for side-setting. This information will be used to determine whether it is feasible and cost effective for Hawaii longline vessels to convert to side setting, and to formulate specifications for vessels side-setting.

11. Affected public (*Mark primary with "P" and all others that apply with "x"*)
a. x Individuals or households
b. P Business or other for-profit
c. ___ Not-for-profit institutions
d. ___ Farms
e. ___ Federal Government
f. ___ State, Local or Tribal Government

12. Obligation to respond (*check one*)
a. [✔] Voluntary
b. [ ] Required to obtain or retain benefits
c. [ ] Mandatory

13. Annual recordkeeping and reporting burden
a. Number of respondents: 24
b. Total annual responses: 24
1. Percentage of these responses collected electronically: 0 %
c. Total annual hours requested: 12
d. Current OMB inventory: 0
e. Difference: 12
f. Explanation of difference
1. Program change: 12
2. Adjustment: ___

14. Annual reporting and recordkeeping cost burden *(in thousands of dollars)*
a. Total annualized capital/startup costs: 0
b. Total annual costs (O&M): 0
c. Total annualized cost requested: 0
d. Current OMB inventory: 0
e. Difference: 0
f. Explanation of difference
1. Program change: ___
2. Adjustment: ___

15. Purpose of information collection (*Mark primary with "P" and all others that apply with "X"*)
a. ___ Application for benefits
b. P Program evaluation
c. ___ General purpose statistics
d. ___ Audit
e. x Program planning or management
f. ___ Research
g. ___ Regulatory or compliance

16. Frequency of recordkeeping or reporting *(check all that apply)*
a. [ ] Recordkeeping
b. [ ] Third party disclosure
c. [✔] Reporting
1. [ ] On occasion 2. [ ] Weekly 3. [ ] Monthly
4. [ ] Quarterly 5. [ ] Semi-annually 6. [ ] Annually
7. [ ] Biennially 8. [ ] Other (describe) One time only

17. Statistical methods
Does this information collection employ statistical methods
[✔] Yes [ ] No

18. Agency Contact (person who can best answer questions regarding the content of this submission)
Name: Anik Clemens
Phone: (808) 973-2935 ext.265

19. Certification for Paperwork Reduction Act Submissions

On behalf of this Federal Agency, I certify that the collection of information encompassed by this request complies with 5 CFR 1320.9

NOTE: The text of 5 CFR 1320.9, and the related provisions of 5 CFR 1320.8(b)(3), appear at the end of the instructions. *The certification is to be made with reference to those regulatory provisions as set forth in the instructions.*

The following is a summary of the topics, regarding the proposed collection of information, that the certification covers:

(a) It is necessary for the proper performance of agency functions;

(b) It avoids unnecessary duplication;

(c) It reduces burden on small entities;

(d) It used plain, coherent, and unambiguous terminology that is understandable to respondents;

(e) Its implementation will be consistent and compatible with current reporting and recordkeeping practices;

(f) It indicates the retention period for recordkeeping requirements;

(g) It informs respondents of the information called for under 5 CFR 1320.8(b)(3):

(i) Why the information is being collected;

(ii) Use of information;

(iii) Burden estimate;

(iv) Nature of response (voluntary, required for a benefit, mandatory);

(v) Nature and extent of confidentiality; and

(vi) Need to display currently valid OMB control number;

(h) It was developed by an office that has planned and allocated resources for the efficient and effective management and use of the information to be collected (see note in Item 19 of instructions);

(i) It uses effective and efficient statistical survey methodology; and

(j) It makes appropriate use of information technology.

If you are unable to certify compliance with any of the provisions, identify the item below and explain the reason in Item 18 of the Supporting Statement.

Signature of Senior Official or designee	Date

Agency Certification (signature of Assistant Administrator, Deputy Assistant Administrator, Line Office Chief Information Officer, head of MB staff for L.O.s, or of the Director of a Program or StaffOffice)	
Signature signed by Anne Lange	Date 08/15/2005
Signature of NOAA Clearance Officer	
Signature signed by Ira M. Grossman	Date 08/18/2005

SUPPORTING STATEMENT
PACIFIC ISLANDS REGION SEABIRD-FISHERIES SIDE-SETTING SURVEY
OMB CONTROL No.: 0648-New

A. JUSTIFICATION

1. <u>Explain the circumstances that make the collection of information necessary</u>.

Under the authority of the Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. 1801 *et seq*. (Magnuson-Stevens Act), the Western Pacific Fishery Management Council (Council) prepared a regulatory amendment to the Fishery Management Plan for the Pelagic Fisheries of the Western Pacific Region (FMP) establishing measures to reduce the accidental take of seabirds in the Hawaii pelagic longline fishery. The primary objective of these seabird measures is the cost-effective reduction of the potential harmful effects of fishing by Hawaii-based longline vessels on the endangered short-tailed albatross and other seabirds. This collection of information fulfills one of the conditions in the 2004 biological opinion (BiOp)[1], issued by the U.S. Fish and Wildlife Service (FWS), under the authority of the Endangered Species Act of 1973, as amended, to minimize the risk to the short-tailed albatross (*Phoebastria albatrus*) The attached BiOp is referenced on page 8 of Part 1 of the proposed regulatory amendment (also attached).

2. <u>Explain how, by whom, how frequently, and for what purpose the information will be used. If the information collected will be disseminated to the public or used to support information that will be disseminated to the public, then explain how the collection complies with all applicable Information Quality Guidelines.</u>

WHO: National Marine Fisheries Service (NOAA Fisheries Service) will conduct side-setting (setting the longline fishing gear from the side of the vessel rather than the stern) interviews on a voluntary basis.

HOW: Interviews will be conducted with vessels that already administer the side setting technique. Vessel operators will be asked to be interviewed at their vessel. Photographs and measurements will be taken, and NOAA Fisheries staff will complete a survey form. Currently there are 15 vessels converted to side setting, however we expect more to convert after the new seabird regulations, if approved by NMFS, take effect in September 2005.

The survey questions include:

Profile Information:

The vessel's name and the captain/owner's name and contact number: these are to identify each vessel.

[1] "Biological Opinion on the Effects of the Reopened Shallow-set Sector of the Hawaii-based Longline Fishery on the Short-tailed Albatross (*Phoebastria albatrus*) [FWS 1-2-1999-F-02.2], October 8, 2004"

The vessel's length: this is to determine if length makes a difference when switching to side setting.

The weight on each branch line: this is to see which weights are being used and which weights work the best for side setting.

The distance from the stern corner to the line shooter: this is in order to determine if it makes a difference in performance, as well as in effectiveness as a seabird deterrent, where the shooter is placed. Is the shooter placed as far forward as possible: this is to see if the shooter could be moved further toward the bow of the vessel, because the further toward the bow the branchlines are thrown, the less likely the bait will be brought back to the surface in the propeller-wash.

Effectiveness of side setting as a seabird deterrent:

1. *Do you use a bird curtain while employing gear*? A bird curtain is a pole with streamers hanging to the ocean's surface. The bird curtain is placed over the area where baited hooks are thrown. Bird curtains obstruct a bird's flight path, so that birds will not dive for baited hooks if the curtain is in their way. Thus, a bird curtain would be an added seabird deterrent when side setting.

2. Do you use other mitigation methods with side setting? These could include using blue dyed bait, strategic offal discards, tori lines, night setting, etc. In order to determine the effectiveness of side setting as a stand-alone technique, it is preferable that vessels use only side setting while setting their gear.

3. Would you prefer side setting to the current mitigation methods? The current suite of measures are very involved, however, the captains and crew are used to using them. This question is posed to get a feeling about whether or not the vessels would like to see a change or if they are comfortable with the current techniques in place.

Operational aspects of side setting:

1. Are there other benefits to side setting beside bird avoidance? Side setting has been thought to be operationally beneficial for the crew as well. Side setting means not having to move gear far distances, as in stern setting. Also, the captain can better supervise the crew during side setting. Another added benefit is that more bait is retained due to fewer seabirds diving for bait.

2. Is side setting a single cost operation? If vessel operators only need to pay upfront for using this seabird deterrent technique, it is another incentive for them to switch to side setting. Some seabird deterrents have high up-keep costs. Side setting looks to be a single cost switch.

3. Was new equipment required to change to side setting? Many vessels will have materials already on board to make the switch to side setting. However, other vessels will have to buy new materials in order to make the switch possible. This question is to determine the percentage that converted to side setting who had to purchase new materials in order to convert to side setting.

4. Was it difficult to move the shooter to the side of the vessel? If the switch takes little time and effort to perform, there is more of an incentive to switch. However, if a vessel operator contemplating conversion would expect to be held up from fishing, then they would be less likely to want to switch their setting configuration.

Privacy issues:

1. Would you mind if we take photos? It is always polite to ask before taking a record of something from a vessel. It is their private property, so it is respectful to ask before taking pictures onboard.

2. Would you mind an observer filming your side setting technique? Again, it is respectful to ask the vessel operators' permission to film their private property.

HOW FREQUENTLY: NOAA Fisheries Service will perform monthly dockside checks to determine which vessels have converted to the side setting method. Those that have converted will be contacted and interviews will be set up. As many as three vessels could be interviewed per week. Out of the 120 vessels currently fishing in the Hawaii longline fleet, it is expected that at least 70% of them (84 vessels) will convert to the side setting method over the next three years. Of these, NOAA Fisheries Service expects a response rate of at least 85% of those vessels contacted for the survey. Therefore, it is expected that at least 71 vessels will be surveyed over the three-year period, out of the 120 vessels currently active in the Hawaii longline fishery.

PURPOSE: NOAA Fisheries Service will use this data to 1) determine whether placing the line-shooter on the side of the vessel is feasible for all vessels in the fleet, 2) determine which specifications for side-setting gear will be most effective for deterring seabirds, as well as most accessible for crew, 3) assess by personal interview the performance of side-setting as an effective seabird mitigation technique, prior to and after requiring side-setting as an adequate and reasonable long-term replacement for some or all of the seabird deterrents currently in use in both the deep-set and shallow-set fishery.

COMPLIANCE: It is anticipated that the information collected will be disseminated to the public or used to support publicly disseminated information. As explained in the preceding paragraphs, the information gathered has utility. NOAA Fisheries Service will retain control over the information and safeguard it from improper access, modification, and destruction, consistent with NOAA standards for confidentiality, privacy, and electronic information. See response #10 of this Supporting Statement for more information on confidentiality and privacy. The information collection is designed to yield data that meet all applicable information quality guidelines. Prior to dissemination, the information will be subjected to quality control measures and a pre-dissemination review pursuant to Section 515 of Public Law 106-554.

3. <u>Describe whether, and to what extent, the collection of information involves the use of automated, electronic, mechanical, or other technological techniques or other forms of information technology.</u>

None of the information elements under this collection require sophisticated information technology. Setting up interviews is accomplished over the phone. Interviews are conducted in person, dockside or on the vessel.

4. <u>Describe efforts to identify duplication.</u>

NOAA Fisheries Service carefully considered whether there were other collections by the U.S. Fish and Wildlife Service (FWS) or other Federal agencies that might meet the information needs presented above. It was determined that this is the first time a side-setting survey has been conducted with vessel operators or personnel from the Hawaii-based longline fleet.

5. If the collection of information involves small businesses or other small entities, describe the methods used to minimize burden.

All of the vessels in the Hawaii-based longline fishery are small business entities of similar sizes and are affected comparably. No special measures are needed to accommodate different sized businesses. Only data pertaining to the assessment of side-setting performance (as suggested in the BiOp), including measurements, photographs, and a short interview, are collected through this survey.

6. Describe the consequences to the Federal program or policy activities if the collection is not conducted or is conducted less frequently.

If this information is not conducted, it will be difficult for NOAA Fisheries Service to comply with the BiOp. Under the terms and conditions of the BiOp, NOAA Fisheries Service will assess the performance of side setting as outlined by a timeline for initial implementation and monitoring of this seabird deterrent. In September 2005, it is likely that side-setting will become a mitigation option in the Hawaii-based longline fishery, at which time NOAA Fisheries Service will continue to monitor side-setting for its effectiveness.

7. Explain any special circumstances that require the collection to be conducted in a manner inconsistent with OMB guidelines.

This collection is consistent with all eight OMB guidelines; no special circumstances require the collection to be conducted in a manner inconsistent with the OMB guidelines.

8. Provide a copy of the PRA Federal Register notice that solicited public comments on the information collection prior to this submission. Summarize the public comments received in response to that notice and describe the actions taken by the agency in response to those comments. Describe the efforts to consult with persons outside the agency to obtain their views on the availability of data, frequency of collection, the clarity of instructions and recordkeeping, disclosure, or reporting format (if any), and on the data elements to be recorded, disclosed, or reported.

NOAA Fisheries Service consulted with FWS, the Western Pacific Fishery Management Council (Council), and the Hawaii Longline Association (HLA) on this collection of information. The October 8, 2004 BiOp requires an evaluation on the feasibility of applying side-setting, i.e. which vessels are willing and physically able to convert to side setting, how long the conversion process will take, and which vessels would benefit more by continuing to stern set. These questions will be obtained in this collection. The notice for public comments on this information collection was published in the Federal Register on March 28, 2005. No public comments were received in response to this notice.

9. <u>Explain any decisions to provide payments or gifts to respondents, other than remuneration of contractors or grantees</u>.

No payments or gifts are involved in this collection

10. <u>Describe any assurance of confidentiality provided to respondents and the basis for assurance in statute, regulation, or agency policy</u>.

Under NOAA Administrative Order 216-100, information submitted in regards to fishery statistics is confidential.

11. <u>Provide additional justification for any questions of a sensitive nature, such as sexual behavior and attitudes, religious beliefs, and other matters that are commonly considered private</u>.

No questions of a sensitive nature will be asked in this data collection.

12. <u>Provide an estimate in hours of the burden of the collection of information.</u>

Annual Burden (Hours):

71 vessel operators x 1 survey/vessel x 30 minute survey / 3 years = 12hrs

The number of respondents is based on the number of vessels in the Hawaii-based longline fleet that are currently active (120) multiplied by the estimated conversion rate to side setting (70%), which gives us 84 vessels, multiplied by the estimated response rate (85%), to give us the estimated number of vessel operators that will be taking the survey = 71. Surveys will be conducted on a voluntary basis, only when vessels are in port. Vessel owners will be notified first, however, surveys will be conducted with owners or captains, as per owner authorization. Interviews will take no longer than 30 minutes, including filling out the questionnaire, taking no more than 5 photographs of equipment placement, and taking measurements of equipment location on each surveyed longline vessel.

Currently, there are 15 vessels voluntarily side setting. More vessels are expected to convert to side setting once the new seabird regulations go into effect (in September, 2005). The number of burden hours (12) is therefore the number of annual burden hours over the three-year period, for an estimated average of 24 respondents per year.

There will be no annual personnel cost burden to respondents for this collection.

13. <u>Provide an estimate of the total annual cost burden to the respondents or record-keepers resulting from the collection (excluding the value of the burden hours in #12 above)</u>.

There is neither a “start-up” capital cost for complying with this collection, nor is there any annual cost to respondents.

14. <u>Provide estimates of annualized cost to the Federal government</u>.

The estimated annual cost to the Federal government to administer this collection is $400 per year, which includes the cost for printing the side setting survey forms ($60), taking photographs of the side setting equipment ($100), and the cost of staff time ($20/hr*12hrs=$240) for taking surveys and incorporating data into a presentation for the Protected Species workshop.

15. Explain the reasons for any program changes or adjustments reported in Items 13 or 14 of the OMB 83-I.

This is a new collection.

16. For collections whose results will be published, outline the plans for tabulation and publication.

No formal scientific publications based on these collections are planned at this time. NMFS, FWS, and the Council will use the data for protected species workshops and fisheries management dealing with seabird mitigation measures, FMP amendments, and evaluations. However, subsequent use of the data collected over the next few years may include scientific papers and publications.

17. If seeking approval to not display the expiration date for OMB approval of the information collection, explain the reasons why display would be inappropriate.

Displaying an expiration date would not be an issue.

18. Explain each exception to the certification statement identified in Item 19 of the OMB 83-I.

There are no exceptions.

B. COLLECTIONS OF INFORMATION EMPLOYING STATISTICAL METHODS

1. Describe (including a numerical estimate) the potential respondent universe and any sampling or other respondent selection method to be used. Data on the number of entities (e.g. establishments, State and local governmental units, households, or persons) in the universe and the corresponding sample are to be provided in tabular form. The tabulation must also include expected response rates for the collection as a whole. If the collection has been conducted before, provide the actual response rate achieved.

This information collection will attempt to sample the entire universe of the respondent population: every vessel that switches to the side setting method over the next three years. A pre-notification letter will be sent to all vessels in the Hawaii longline fleet announcing the beginning of this information collection. NOAA Fisheries Service will then perform monthly dockside checks to determine which vessels have converted to the side setting method. These are the vessels that will be asked to participate in the survey. If the vessel operators do not respond to a survey request the first time, two follow-ups will be made, one per month. If the vessel doesn't respond to the request by the third try, the vessel will be taken out of the survey. Out of the 120 vessels currently fishing in the Hawaii longline fleet, it is expected that at least

70% will convert to the side setting method over the next three years. Of these 84 vessels, it is predicted that at least 85% will respond to the survey. Therefore, NOAA Fisheries Service expects to collect responses from at least 71 out of the 120 vessels currently active in the Hawaii longline fishery.

2. Describe the procedures for the collection, including: the statistical methodology for stratification and sample selection; the estimation procedure; the degree of accuracy needed for the purpose described in the justification; any unusual problems requiring specialized sampling procedures; and any use of periodic (less frequent than annual) data collection cycles to reduce burden.

Please refer to the response in Part B, question #1.

3. Describe the methods used to maximize response rates and to deal with non-response. The accuracy and reliability of the information collected must be shown to be adequate for the intended uses. For collections based on sampling, a special justification must be provided if they will not yield "reliable" data that can be generalized to the universe studied.

A pre-notification letter will be sent to all vessels in the Hawaii longline fleet announcing the beginning of this information collection. NOAA Fisheries Service will then perform monthly dockside checks to determine which vessels have converted to the side setting method. These are the vessels that will be asked to participate in the survey. If the vessel operators do not respond to a survey request the first time, two follow-ups will be made, one per month.

Respondents, namely vessel owners and captains, are expected to respond positively to the opportunity to participate in the survey and to provide NOAA Fisheries Service with information that is accurate and helpful. In prior studies conducted by the industry, the same respondents answered questions with integrity and with a willingness to help establish more proficient mitigation techniques in their fishery. Vessel owners and captains are willing to give information to NOAA Fisheries Service if NOAA Fisheries Service is willing to listen. Therefore, respondents are likely to show compliance in this data collection.

4. Describe any tests of procedures or methods to be undertaken. Tests are encouraged as effective means to refine collections, but if ten or more test respondents are involved OMB must give prior approval.

The elements of this data collection were reviewed by staff members of the Sustainable Fisheries Division, Pacific Islands Region, and are considered to be representative of the information NOAA Fisheries Service seeks to gain, as well as being collection elements that respondents are willing to respond to from a confidential standpoint.

5. Provide the name and telephone number of individuals consulted on the statistical aspects of the design, and the name of the agency unit, contractor(s), grantee(s), or other person(s) who will actually collect and/or analyze the information for the agency.

NOAA Fisheries Service, Pacific Islands Region, Sustainable Fisheries Division will be administering this information collection, including sending a pre-notification letter to all potential respondents, making dockside checks, and finally conducting interviews using the survey forms. Pacific Islands Fisheries Science Center will help analyze the data collected in order to determine whether the side setting technique is technically and logistically feasible for all vessels in the Hawaii longline fleet.

HAWAII LONGLINE FISHING VESSEL SIDE SETTING DATA FORM

OMB Control No.: 0648-New
Expires: mm/dd/yyyy

I. PROFILE INFORMATION

Vessel Name:

Captain/Owner: Contact Number:

Date of Profile:

Vessel Length (ft):

Weight on branchline (g), within 1m of the hook:

Distance from Stern to Shooter (ft), Is it far forward as possible:

II. QUESTIONS ON EFFECTIVENESS AND PRACTICALITY

	Checklist	***Yes***	***No***	***Comments***
1	Do you use a bird curtain while employing gear?			
2	Do you use other mitigation methods with side setting?			
3	Would you prefer side setting to the current mitigation methods?			
4	Are there other benefits to side setting beside bird avoidance? (Bait retention, supervision, gear moving)			
5	Is side setting a single cost operation?			
6	Was new equipment required to change to side setting?			
7	Was it difficult to move the shooter to the side of the vessel?			
8	Would you mind us taking photos?			
9	Would you mind an observer filming your side setting technique?			

HAWAII LONGLINE FISHING VESSEL SIDE SETTING DATA FORM

III. ADDITIONAL INPUT AND COMMENTS ON SIDE SETTING

PAPERWORK REDUCTION ACT STATEMENT

Public reporting burden for this information is estimated to average 30 minutes per response, including interview time, time for taking photographs and time for taking measurements on the vessel. Send comments regarding this burden estimate or any other response of this collection of information, including suggestions for reducing this burden, to Regional Administrator, Pacific Islands Region, NOAA Fisheries, 1601 Kapiolani Blvd., Suite 1110, Honolulu, Hawaii 96814.

A Hawaii-based longline fishing vessel is collecting these data to provide information needed to maximize the probability of survival of the short-tailed albatross that is incidentally hooked or entangled by longline gear during fishing operations conducted.

Responses to the collection are voluntary. Contact information will be kept confidential. Notwithstanding any other provisions of the law, no person is required to respond to, nor shall any person be subject to a penalty for failure to comply with, a collection of information subject to the requirements of the Paperwork Reduction Act, unless that collection of information displays a currently valid OMB Control Number.

WESTERN PACIFIC REGIONAL FISHERY MANAGEMENT COUNCIL

Additional Measures to Reduce the Incidental Catch of Seabirds in the Hawaii-Based Longline Fishery

A Regulatory Amendment to the Fisheries Management Plan for the Pelagic Fisheries of the Western Pacific Region

April 6, 2005
Western Pacific Regional Fishery Management Council
1164 Bishop St., Suite 1400
Honolulu, HI 96813

2.0 Summary

Hawaii-based pelagic longline fishing vessels inadvertently hook, entangle and kill black-footed albatrosses (*Phoebastria nigripes*) and Laysan albatrosses (*Phoebastria immutabilis*) that nest in the Northwestern Hawaiian Islands (NWHI). On rare occasions wedge-tailed and sooty shearwaters are also incidentally caught by these vessels. However, there are no observations or reports of interactions between the fishery and the endangered short-tailed albatross (*Phoebastria albatrus*). The number of fishery interactions with all seabirds has been significantly reduced since 2000, due to the closure of the swordfish segment of the Hawaii-based longline fishery, and the implementation of new seabird mitigation measures based on research conducted cooperatively by fishery participants, environmental organizations, and the National Marine Fisheries Service (NMFS, also known as NOAA Fisheries).

In October 1999, the Western Pacific Fishery Management Council (Council, also known as the Western Pacific Regional Fishery Management Council) recommended three measures to mitigate the harmful effects of fishing by vessels registered for use under Hawaii longline limited access permits (Hawaii-based longline vessels) on seabirds. The first measure required vessel operators fishing with longline gear north of 25° N. latitude to employ two or more of the following seabird deterrent techniques: 1) maintain adequate quantities of blue dye on board and use only completely thawed, blue-dyed bait; 2) discard offal while setting and hauling the line in a manner that distracts seabirds from hooks; 3) tow a NMFS-approved deterrent (such as a tori line or a buoy) while setting and hauling the line; 4) deploy line with line-setting machine so that the line is set faster than the vessel's speed and attach weights equal to or greater than 45 grams to branch lines within one meter of each hook; 5) attach weights equal to or greater than 45 grams to branch lines within one meter of each hook; 6) begin setting the longline at least one hour after sunset and complete the setting process at least one hour before sunrise, using only the minimum vessel's lights necessary for safety. The second measure directed vessel operators to make every reasonable effort to ensure that birds brought onboard alive are handled and released in a manner that maximizes the probability their long-term survival as directed by seabird handling guidelines. The final measure required all vessel owners and operators to annually complete a protected species educational workshop conducted by NMFS.

On July 5, 2000, NMFS published a proposed rule for the Hawaii-based longline fishery based on the Council's recommended measures. However, the agency did not proceed with the publication of a final rule, as the USFWS had indicated it was developing a Biological Opinion (BiOp) for the fishery action under section 7 of the Endangered Species Act (ESA) for the short-tail albatross. This endangered species has been documented in small numbers in the NWHI, and the USFWS BiOp, published on November 28, 2000, concluded that the Hawaii-based longline fishery as proposed was not likely to jeopardize the continued existence of the short-tailed albatross. Nevertheless, it included several non-discretionary measures to be employed by the Hawaii-based longline fishery and implemented by NMFS. In contrast to the Council's recommendation requiring the use of any two of the six approved deterrents when fishing north of 25° N., the 2000 USFWS BiOp required that all Hawaii-based vessels operating with longline gear north of 23° N. latitude use thawed blue-dyed bait and discard offal strategically to distract birds during setting and hauling of longline gear. In addition, when making deep sets (targeting

tuna) north of 23° N. latitude, Hawaii-based vessel operators were required to employ a line-setting machine with weighted branch lines (a weight of at least 45 g placed within one meter of each hook). All longline vessel operators and crew were also required to follow certain handling techniques to ensure that all seabirds would be handled and released in a manner that maximizes the probability of their long-term survival, and vessel operators were required to annually complete a protected species educational workshop conducted by NMFS. Optional mitigation measures include towed deterrents, or the use of weighted branch lines without a line-setting machine (in the case of swordfish or mixed target sets). In addition, operators of Hawaii-based vessels making shallow sets (targeting swordfish) north of 23° N. were required to begin the setting process at least one hour after sunset and complete the setting process by sunrise.

Emergency and final regulations implementing seabird mitigation measures for the Hawaii-based longline fishery were promulgated on June 12, 2001 and May 14, 2002, respectively. However, the requirements regarding shallow-set longlining north of 23° N. latitude were not implemented by NMFS as, for the purpose of minimizing effects of the fishery on threatened and endangered sea turtle species, on March 31, 2001, by order of the court NMFS prohibited all shallow-set pelagic longline fishing for swordfish north of the equator by Hawaii-based vessels.

The March, 2001 closure of the shallow set longline component of the fishery led NMFS to reinitiate consultation with the USFWS to examine the impacts of the reduced fishery on short-tailed albatrosses. The subsequent USFWS 2002 BiOp was released November 18, 2002, and again concluded that the Hawaii-based longline fishery was not likely to jeopardize the continued existence of the short-tailed albatross.

In 2003 new information, experimental results and technological advances in longline gear design that concern interactions between the fishery and sea turtles prompted the Council recommend new measures for the Hawaii-based fishery. As a result current regulations allow a limited amount (2,120 sets annually) of shallow-set longline effort by Hawaii-based swordfish vessels using circle hooks with mackerel-type bait. Because this action allowed limited shallow-setting, it also implemented the USFWS 2000 BiOp requirement that any shallow-setting occurring north of 23° N. latitude be done at night. Final regulations implementing these recommendations were promulgated on April 2, 2004

Based on NMFS' extrapolations from observer data during 1999 the fleet is estimated to have brought onboard 2,320 hooked or entangled albatrosses (1,301 black-footed and 1,019 Laysan), while in 2002 the fleet is estimated to have brought onboard 113 hooked or entangled albatrosses (65 black-footed and 51 Laysan), and 257 albatrosses (111 black-footed and 146 Laysan) in 2003.Although vessel and observer records indicate that some birds are released alive it is unknown how long they actually survive and a worst-case scenario would assume that all albatrosses brought onboard represent mortalities. The increase between 2002 and 2003 may be related to the increase in nesting populations of black-footed and Laysan albatrosses in the Northwestern Hawaiian Islands (NWHI) (a 7.2% increase in active black-footed albatross nests on Midway Atoll as compared to 2001 and a 53.9% increase in Laysan albatross nests on Midway as compared to 2001). In addition, the USFWS has reported that worldwide populations of short-tailed albatrosses are increasing at more than 7% per year. The most recent information indicates that NWHI nesting numbers for both species have remained stable since 1991 (USFWS 2005).

A series of cooperative research trials with new mitigation methods were conducted between 2002 and 2003 on Hawaii-based longline vessels. The trials found that underwater setting chutes (which deploy baited hooks underwater and out of the reach of seabirds) and side setting (which deploys the longline laterally from amidships, rather than directly over the stern), were both effective in reducing interactions with seabirds. This document examines a range of alternatives that would allow or require the use of one or more of these techniques to cost-effectively further reduce seabird interactions with the Hawaii-based fishery. Also examined is the use of tori lines (also known as streamer or bird scaring lines) which have been found to be effective in reducing seabird interactions in the Alaska demersal longline fishery.

Two assumptions were made in crafting the alternatives, which are summarized in Table I. First, that the ‘no action’ alternative means maintaining the suite of measures currently required (by FMP regulations and by the requirements of the US Fish and Wildlife Service’s 2000 and 2002 BiOps which were in effect during the time this amendment was being developed). Second, that these current measures are an option in those alternatives offering a choice of mitigation measures (e.g. fishermen can elect to maintain operating under the current suite of measures or use side setting).

Table I. Seabird mitigation measures included in each alternative. (Current requirements for annual protected species workshop attendance and seabird handling protocols would remain in place under all alternatives.)	
Alt.	**Description**
1	**CURRENT MEASURES** **All Hawaii-based longline vessels** fishing north of 23° N. must: Discharge offal and spent bait on the opposite side from setting or hauling Use blue-dyed, thawed bait, and have a minimum of 2 cans of dye onboard **Vessels deep-setting** north of 23° N. must use a line setting machine (line shooter) and use minimum 45g weights within 1m of each hook, if using a monofilament main line[1] **Vessels shallow-setting** north of 23° N must begin setting at least 1 hour after local sunset and complete the setting process by local sunrise, using the minimum vessel lights necessary
2A	Use current mitigation measures **OR** use side setting, when fishing north of 23° N.
2B	Use above current mitigation measures **OR** use side setting, in all areas
3A	Use current mitigation measures **OR** use an underwater setting chute, when fishing north of 23° N.
3B	Use current mitigation measures **OR** use an underwater setting chute, in all areas
4A	Use current mitigation measures **OR** use a tori line (e.g. paired streamer lines), when fishing north of 23° N.
4B	Use current mitigation measures **OR** use a tori line (e.g. paired streamer lines), in all areas
5A	Use current mitigation measures **OR** use side setting **OR** use an underwater setting chute, when fishing north of 23° N.
5B	Use current mitigation measures **OR** use side setting **OR** use an underwater setting chute, in all areas
6A	Use current mitigation measures **OR** use side setting **OR** use an underwater setting chute **OR** use a tori line (e.g. paired streamer lines), when fishing north of 23° N.
6B	Use above current mitigation measures **OR** use side setting **OR** use an underwater setting chute **OR** use a tori line (e.g. paired streamer lines), in all areas

Table I. Seabird mitigation measures included in each alternative. (Current requirements for annual protected species workshop attendance and seabird handling protocols would remain in place under all alternatives.)	
7A	Use current mitigation measures **OR** use side setting **OR** use a tori line (e.g. paired streamer lines), when fishing north of 23° N.
7B	Use current mitigation measures **OR** use side setting **OR** use a tori line (e.g. paired streamer lines), in all areas
7C	a. In all areas, shallow setting boats use current mitigation measures, excluding the requirement to use blue-dyed bait, OR use side setting **OR** use an underwater setting chute **OR** use a tori line (e.g. paired streamer lines). b. North of 23° N. deep setting boats use current mitigation measures, excluding the requirement to use blue-dyed bait, **OR** use side setting **OR** use an underwater setting chute **OR** use a tori line (e.g. paired streamer lines), in conjunction with a line shooter and weighted branchlines.
7D	a. All deep setting vessels must either side-set, or use a tori line plus the currently required measures (line shooter with weighted branch lines, blue dyed thawed bait and strategic offal discards) when fishing north of 23° - with the requirement to use strategic offal discards modified to require that vessel operators use them only when seabirds are present; AND b. All shallow setting vessels must either side-set, or use a tori line plus the currently required measures (night setting, blue dyed thawed bait and strategic offal discards) wherever they fish - with the requirement to use strategic offal discards modified to require that vessel operators use them only when seabirds are present.
8A	Use current mitigation measures **PLUS** side setting, when fishing north of 23° N.
8B	Use current mitigation measures **PLUS** side setting, in all areas
9A	Use side setting when fishing north of 23° N.
9B	Use side setting in all areas
10A	Use side setting **UNLESS** technically infeasible in which case use current mitigation measures, when fishing north of 23° N.
10B	Use side setting **UNLESS** technically infeasible in which case use above current mitigation measures, in all areas
11A	Use side setting **UNLESS** technically infeasible, in which case use an underwater setting chute **OR** a tori line **OR** current mitigation measures without blue bait or strategic offal discards (shallow-setting vessels set at night, deep-setting vessels use line shooters with weighted branch lines), when fishing north of 23° N.

Table I. Seabird mitigation measures included in each alternative. (Current requirements for annual protected species workshop attendance and seabird handling protocols would remain in place under all alternatives.)	
11B	Use side setting **<u>UNLESS</u>** technically infeasible, in which case use an underwater setting chute **<u>OR</u>** a tori line **<u>OR</u>** above current mitigation measures without blue bait or strategic offal discards (shallow-setting vessels set at night, deep-setting vessels use a line shooter with weighted branch lines), in all areas
12	Voluntarily use side setting, **<u>OR</u>** night setting, **<u>OR</u>** an underwater setting chute, **<u>OR</u>** a tori line, **<u>OR</u>** a line shooter with weighted branch lines, when fishing south of 23° N.
1. Basket gear may also be used if deep set longline fishing above 23° N., with a requirement that the mainline be set slack to maximize the sinking of baited hooks	

Table II presents a summary evaluation of the various mitigation measures considered here. Most methods are very effective at reducing contacts with gear and capture of seabirds, achieving 80% reductions or greater, as compared to fishing without any seabird mitigation measures. Caution should be exercised in comparing between different techniques, since they were tested under a variety of different conditions and seabird densities on different fishing platforms, and under different experimental protocols. As such, the ranking of deterrent measures in Table II is somewhat subjective. Moreover the variances about the point estimates are very wide and overlapping in many cases (Christofer Boggs, PIFSC, personal communication), and thus other factors as discussed below also need to be considered when deciding on the preferred alternative.

The ideal measure or technique for mitigating interactions with seabirds should minimize seabird capture, achieve high compliance among the fishing fleet, , be perceived as cost-effective, not be overly dependent on crew behavior and work consistently across a range of variables such as time, location, weather, sea state, seabird density etc. Table II is summarized from a more detailed summary of the various mitigation research observations in Appendix 1, while the details of the evaluation of the estimated costs, operational, compliance and enforcement characteristics of the different measures is contained within Section 10.6.8.

A comparison of the alternatives requires examination of both the effectiveness of the required measures in reducing seabird interactions, and their impacts on other marine resources and fishery participants. None of the alternatives examined here are anticipated to have regionally significant impacts on fishing operations or catches and for that reason no impacts on other marine resources are expected. In general, alternatives which allow greater flexibility are preferred by fishery participants as they allow for a variety of techniques to be used based on vessel capabilities, operator experience, and local conditions. To the extent that this promotes voluntary compliance, such alternatives are preferable. In addition, fishery participants are aware that their cooperative research has already led to significant reductions in seabird interactions and maintaining this collaborative attitude through the implementation of cost-effective and flexible measures will also likely promote voluntary compliance.

Table II. Summary of Qualitative Appraisals and Costs of Deterrent Measures

(●= good; ●●= better; ●●●=best)

Mitigation Measure	Evaluation Parameters		
	Operational Characteristics	**Cost/Vessel**	**Compliance and Enforcement**
Thawed blue-dyed bait TBDB)	●●	$1,400 annual	●
Strategic offal discards (SOD)	●◖	$150 initial $150 annual	●
Line shooter with weighted branch lines (on tuna vessels)	●●●	already purchased	●●●
Tori line (TL)	●	$3,300 initial $4,600 annual	●
Night setting (on swordfish vessels) (NS)	●●	$0	●●
Underwater setting chute (USC)	●	$4,000 initial	●
Side setting (+ 60g swivels within 1m of the hook) (SS)	●●◖	$4,000 initial $50 annual	●●●

At its 123rd meeting in June, 2004, the Council reviewed a draft of the material presented here and took initial action by selecting alternative 7C as its preliminary preferred alternative. At its 124th meeting (October 12-15, 2004), the Council took final action and recommended the following action to NMFS:

> *All shallow-setting longline vessels, wherever they fish, be required to either use side setting, or to use all of the following measures simultaneously: night setting, blue bait, offal discards, and tori lines.*
>
> *All deep-setting longline vessels, when fishing north of 23 deg N, be required to either use side setting, or to use all of the following measures simultaneously: a line shooter with weighted branch lines, blue bait, offal discards, and tori lines.*
>
> *The Council will use the period of the regulatory process to collect supplementary data on bird behavior and coordinate with the USFWS to remove the requirement for blue dyed thawed bait and offal discards, if appropriate.*

A letter received by the National Marine Fisheries Service (NMFS) from the US Department of the Interior (dated October 15, 2004, but delivered after the 124th Council meeting), stated that blue dyed bait and strategic offal discards should be retained as mitigation measures. However, the letter further suggested that strategic offal discards should be used by longline vessels only when seabirds were present.

Thus the Council's final preferred alternative (7D) is as follows:

A) All deep setting Hawaii-based longline vessels must either side-set, or use a tori line plus the currently required measures (line shooter with weighted branch lines, blue dyed thawed bait and strategic offal discards) when fishing north of 23 ° - with the requirement to use strategic offal discards modified to require that vessel operators use them only when seabirds are present;

AND

B) All shallow setting Hawaii-based longline vessels must either side-set, or use a tori line plus the currently required measures (night setting, blue dyed thawed bait and strategic offal discards) wherever they fish - with the requirement to use strategic offal discards modified to require that vessel operators use them only when seabirds are present.

3.0 Table of Contents

3.1 List of Tables

3.2 List of Figures

3.3 List of Acronyms

CFR	Code of Federal Regulations
CNMI	Commonwealth of the Northern Mariana Islands
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
FEIS	Final Environmental Impact Statement
FMP	Fishery Management Plan
HAPC	Habitat Areas of Particular Concern
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MUS	Management Unit Species
NAO	NOAA Administrative Order
NEPA	National Environment Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OY	Optimum Yield
PMUS	Pelagic Management Unit Species
PRA	Paperwork Reduction Act
RFA	Regulatory Flexibility Act

4.0 Introduction

4.1 Responsible Agencies

The Council was established by the Magnuson-Stevens Fishery and Conservation Management Act (MSA) to develop Fishery Management Plans (FMPs) for fisheries operating in the US Exclusive Economic Zone (EEZ) around American Samoa, Guam, Hawaii and Commonwealth of the Northern Mariana Islands and the US possessions in the Pacific.[1] Once an FMP is approved by the Secretary of Commerce, it is implemented by federal regulations which are enforced by the National Marine Fisheries Service and the US Coast Guard, in cooperation with state, territorial and commonwealth agencies. For further information contact:

Kitty M. Simonds Executive Director Western Pacific Regional Fishery Management Council 1164 Bishop St., Suite 1400 Honolulu, HI 96813 (808) 522 8220	William L. Robinson Regional Administrator National Marine Fisheries Service Pacific Islands Regional Office 1601 Kapiolani Blvd., Suite 1110 Honolulu, HI 96814 (808) 973-2935

4.2 Public Review Process and Schedule

On May 14, 2002, a final rule was published implementing the terms and conditions of a November 28, 2000 Biological Opinion (BiOp) issued under section 7 of the Endangered Species Act by the U.S. Fish and Wildlife Service (USFWS). These measures apply to all Hawaii-based longline vessels and consist of the following requirements:

When fishing above 23° N., vessel operators must:

> Completely thaw and dye all bait blue before using it.
>
> Discharge spent bait and fish parts to distract seabirds while setting or hauling the gear (strategic offal discards).
>
> Use a line shooter or line setting machine with weighted branch lines to set the gear when deep setting (an October 18, 2001 amendment allows the use of basket gear instead of a line shooter with weighted branch lines).

In addition, all Hawaii-based longline vessel operators are required to follow seabird handling requirements wherever they fish, and vessel operators and owners must annually attend a protected species workshop conducted by the National Marine Fisheries Service (NMFS, also known as NOAA Fisheries or NOAA Fisheries Service).

[1] Howland, Baker, Jarvis, Wake and Johnston Islands, Palmyra and Midway Atolls and Kingman Reef.

A second final rule was published in the Federal Register on April 2, 2004 which requires night setting (begin setting an hour after sunset and complete the setting process by dawn) by Hawaii-based longline vessels making shallow sets above 23° N.

New research results were communicated to the Council and its Scientific and Statistical Committee (SSC) during regular public meetings convened in 2002 and 2003. A series of research trials with new mitigation methods were conducted between 2002 and 2003 using Hawaii-based longline vessels. The trials found that underwater setting chutes and side setting, (where the longline is deployed laterally from amidships rather than directly over the stern), were also effective in reducing interactions with seabirds.

At its 85th meeting (February 25, 2004) the SSC considered a range of possible seabird mitigation measures for the Hawaii-based longline fishery. The SSC suggested the addition of an additional alternative to provide fishermen with the flexibility of using the mitigation measures currently required, using an underwater setting chute, or side setting. At its122nd meeting (March 24, 2004) the Council heard a similar presentation and also considered the above recommendation from the SSC. Following a public hearing, the Council directed staff to prepare a draft Pelagics FMP amendment that examines a range of alternatives for seabird mitigation, including that suggested by the SSC. At its 123rd meeting on June 23, 2004, the Council took initial action by selecting a preliminarily preferred alternative. As described in Section 7.0, at its 124th meeting (October 12-15, 2004) the Council took final action, and following the late-receipt of a comment letter from the Department of the Interior to NMFS, subsequently recommended the following action to NMFS:

A) All deep setting Hawaii-based longline vessels must either side-set, or use a tori line plus the currently required measures (line shooter with weighted branch lines, blue dyed thawed bait and strategic offal discards) when fishing north of 23° - with the requirement to use strategic offal discards modified to require that vessel operators use them only when seabirds are present;

AND

B) All shallow setting Hawaii-based longline vessels must either side-set, or use a tori line plus the currently required measures (night setting, blue dyed thawed bait and strategic offal discards) wherever they fish - with the requirement to use strategic offal discards modified to require that vessel operators use them only when seabirds are present.

4.3 List of Preparers

This document was prepared by (in alphabetical order):

Paul Dalzell, Pelagics Coordinator
Western Pacific Regional Fisheries Management Council

Joshua DeMello, Fishery Analyst
Western Pacific Regional Fishery Management Council

Marcia Hamilton, Economist
Western Pacific Regional Fishery Management Council

5.0 Purpose and Need for Action

The primary objective of the proposed action is the cost-effective further reduction of the potentially harmful effects of fishing by Hawaii-bsed longline vessels on the short-tailed albatross, but the overarching goal is to reduce the potentially harmful effects of fishing by Hawaii-based longline vessels on all seabirds in a cost-effective manner. Hawaii-based pelagic longline fishing vessels inadvertently hook, entangle and kill black-footed albatrosses (*Phoebastria nigripes*) and Laysan albatrosses (*Phoebastria immutabilis*) that nest in the Northwestern Hawaiian Islands (NWHI). On rare occasions Wedge-tailed and sooty shearwaters are also incidentally caught by these vessels. However, there are no observations or reports of interactions between the fishery and the endangered short-tailed albatross (*Phoebastria albatrus*). Fishery interactions may impact individual seabirds and, if large enough, in turn impact seabird populations so as to alter their trajectory (e.g. from positive to negative).

The number of Hawaii-based longline fishery interactions with all seabirds has been significantly reduced since 2000, due to the closure of the swordfish segment of the Hawaii-based longline fishery, and the implementation of new seabird mitigation measures based on research conducted cooperatively by the fishery participants, environmental organizations, and NMFS.

Based on NMFS' extrapolations from observer data, during 1999 the fleet is estimated to have brought onboard 2,320 hooked or entangled, and presumed drowned albatrosses (1,301 black-footed and 1,019 Laysan), while in 2002 the fleet is estimated to have brought onboard 113 hooked or entangled, and presumed drowned albatrosses (65 black-footed and 51 Laysan), and 257 albatrosses (111 black-footed and 146 Laysan) in 2003. The increase between 2002 and 2003 may be partially related to the increase in nesting populations of black-footed and Laysan albatrosses in the Northwestern Hawaiian Islands (NWHI) (a 7.2% increase in active black-footed albatross nests on Midway Atoll as compared to 2001 and a 53.9% increase in Laysan albatrosses on Midway breeding pairs as compared to 2001). However there are likely other factors involved as well that are not wholly exclusive of the fishery's activities.

A series of cooperative research trials with new seabird deterrent methods were conducted between 2002 and 2003 on Hawaii-based longline vessels. The trials found that underwater setting chutes (which deploy baited hooks underwater and out of the reach of seabirds) and side setting (which deploys the longline laterally from amidships, rather than directly over the stern), were both effective in further reducing interactions with seabirds. Also examined was the use of tori lines (also known as streamer or bird scaring lines) which have been found to be effective in reducing seabird interactions in the Alaska demersal longline fishery. The Council is now considering including these new mitigation measures to aid the fishery in cost-effectively further reducing seabird interactions.

6.0 Management Objectives

The objectives of the Fishery Management Plan for the Pelagic Fisheries of the Western Pacific Region (Pelagics FMP), as amended in Amendment 1, are as follows:

1. To manage fisheries for management unit species (MUS) in the Western Pacific Region to achieve optimum yield (OY).

2. To promote, within the limits of managing at OY, domestic harvest of the MUS in the Western Pacific Region EEZ and domestic fishery values associated with these species, for example, by enhancing the opportunities for:

a. satisfying recreational fishing experiences;
b. continuation of traditional fishing practice for non-market personal consumption and cultural benefits; and
c. domestic commercial fishermen, including charter boat operations, to engage in profitable fishing operations.

3. To diminish gear conflicts in the EEZ, particularly in areas of concentrated domestic fishing.

4. To improve the statistical base for conducting better stock assessments and fishery evaluations, thus supporting fishery management and resource conservation in the EEZ and throughout the range of the MUS.

5. To promote the formation of a regional or international arrangement for assessing and conserving the MUS and tunas throughout their range.

6. To preclude waste of MUS associated with longline, purse seine, pole-and-line or other fishing operations.

7. To promote, within the limits of managing at OY, domestic marketing of the MUS in American Samoa, CNMI, Guam and Hawaii.

The primary objective of this management action is the cost-effective further reduction of the potentially harmful effects of fishing by Hawaii-based longline vessels on the short-tailed albatross, but the overarching goal is to reduce the potentially harmful effects of fishing by Hawaii-based longline vessels on all seabirds in a cost-effective manner. This action is consistent with Objectives 1, 2 and 7 above; to achieve optimum yield and promote domestic marketing of MUS on a long-term basis from the region's pelagic fishery, without likely jeopardizing the continued existence of any threatened or endangered species.

7.0 Initial Actions

Measures taken by the Council in the early 1990s to manage the pelagic species fishery reduced the incidental catch of seabirds by Hawaii-based longline vessels. These measures include limiting the size of the longline fleet to 164 permits, and prohibiting longline fishing in a 50 nautical mile area (protected species zone) around the Northwestern Hawaiian Islands (NWHI). Specific actions by the Council to reduce the incidental catch of seabirds began in 1996, when the Council and the USFWS conducted a workshop in September of that year in Honolulu to inform longline fishermen of the problem and various mitigation measures. The book *Catching Fish, Not Birds* by Nigel Brothers (1995) was translated into Vietnamese and Korean and copies were sent to all holders of a NMFS Hawaii longline limited access permit. A second workshop informing fishermen of the problem was held in January 1997. At that time, the USFWS also distributed a laminated card showing various species of albatross and describing possible mitigation methods. The card was issued in both English and Vietnamese.

Assessments of the level of voluntarily adoption of mitigation measures by Hawaii longline fishermen indicated that the education program described above was only partially successful. Two dockside visits by Council and USFWS staff in mid-1997, to examine what mitigation measures, if any, were being employed revealed that, of the 12 longline vessels surveyed, five used weighted branch lines, one used bait dyed blue to camouflage it in the water, three towed a trash bag or buoy, one scared birds with a horn, one distracted the birds by strategically discarding offal and two vessels took no measures. A mail survey of 128 Hawaii-based longline vessels was conducted by the Environmental Defense Fund during the same period. Ten of the 18 fishermen that responded to a question regarding mitigation measures employed indicated that they were actively using some type of measure, such as reducing the use of deck lights at night, adding weights to increase the sink rate of the fishing line during setting, strategically discarding offal to distract birds, using a line-setting machine or setting the line under-water.

In October 1997, NMFS observers deployed on Hawaii-based longline vessels began recording which mitigation measures, if any, were being used voluntarily by fishermen. Information from the observer program for 1998 showed that nearly all vessels used some measure, the most common being to avoid setting the line in the vessel wake. About 55% of the vessels thawed the bait before baiting hooks, 29% of the vessels set at night and 11% avoided discarding unused bait while setting the fishing line. Only two percent of the vessels used a towed deterrent or blue-dyed bait.

In October 1998, a seabird population biology workshop was convened at the Council office in Honolulu to make a preliminary assessment of the impact of fishing by the Hawaii-based longline fleet on the black-footed albatross population in the NWHI (WPRFMC, 2000). The incidental catch of seabirds by fishing vessels was identified as a source of chronic or long term mortality. It was noted that the impact of the interactions would be more serious if the albatrosses killed were predominantly adult birds because this would result not only in the loss of chicks, but also the loss of many breeding seasons as the surviving mate must find another mate and establish a pair bond. However, banding data analyzed at the workshop suggested that it was predominantly immature juvenile birds that were interacting with longline boats. This finding is consistent with that of Brothers (1991), who observed that about four times as many juvenile as adult albatrosses are caught in the Southern Bluefin tuna (*Thunnus maccoyii*) longline fisheries.

In anticipation that regulatory measures would be required to further reduce the incidental catch of seabirds in the Hawaii longline fishery, the Council in 1998, contracted Garcia and Associates to assess which mitigation methods would be most effective for local vessels under actual commercial fishing conditions. As reported in McNamara *et al.* (1999), the study assessed the effectiveness of various mitigation methods aboard Hawaii-based longline vessels under actual fishing conditions. The mitigation techniques evaluated included several of those identified by Alexander, Robertson and Gales (1997) as being effective in other fisheries, such as night setting, towed deterrents, modified offal discharge practices and thawed bait. In addition, Garcia and Associates evaluated blue-dyed squid bait, the effectiveness of which appeared promising based on limited use by Hawaii-based longline vessels, but which had not been scientifically assessed. Because data collected by NMFS observers showed that Hawaii-based longline vessels targeting swordfish had higher incidental catches of seabirds than did vessels targeting tuna, Garcia and Associates tested the effectiveness of mitigation measures primarily during swordfish trips. The criteria used by Garcia and Associates to evaluate the effectiveness of mitigation measures included the number of attempts on (chases, landings and dives) and interactions (physical contact) with fishing gear as well as actual hookings and mortalities.

In early 1999, NMFS' Honolulu Laboratory assessed the effectiveness of several seabird mitigation methods during a cruise on a NOAA research vessel in the waters around the NWHI (Boggs 2001). This study was designed to supplement the field test of towed deterrents and blue-dyed bait conducted by Garcia and Associates, and to evaluate an additional measure: weighted branch lines. The advantage of using a research vessel to test the effectiveness of mitigation measures was that fishing operations could be controlled to improve the opportunities for observation, comparison and statistical analysis. For example, by setting gear in daylight researchers greatly increased the number of bird interactions with the gear in the presence and absence of each mitigation method. Easily regurgitated net pins were substituted for hooks in the research to avoid injuring seabirds.

Based on observer records from 1994 to 1998, the Honolulu Laboratory also assessed the efficacy of a line-setting machine used in combination with weighted branch lines in reducing seabird interactions.

In October 1999, the Western Pacific Fishery Management Council (Council) recommended three measures to mitigate the harmful effects of fishing by vessels registered for use under Hawaii longline limited access permits (Hawaii-based longline vessels) on seabirds. The first measure required vessel operators fishing with longline gear north of 25° N. latitude to employ two or more of the following seabird deterrent techniques: 1) maintain adequate quantities of blue dye on board and use only completely thawed, blue-dyed bait; 2) discard offal while setting and hauling the line in a manner that distracts seabirds from hooks; 3) tow a NMFS-approved deterrent (such as a tori line or a buoy) while setting and hauling the line; 4) deploy line with line-setting machine so that the line is set faster than the vessel's speed and attach weights equal to or greater than 45 grams to branch lines within one meter of each hook; 5) attach weights equal to or greater than 45 grams to branch lines within one meter of each hook; 6) begin setting the longline at least one hour after sunset and complete the setting process at least one hour before sunrise, using only the minimum vessel's lights necessary for safety. The second measure directed vessel operators to make every reasonable effort to ensure that birds brought onboard alive are handled and released in a manner that maximizes the probability their long-term survival as directed by seabird handling guidelines. The final measure required all vessel owners and operators to annually complete a protected species educational workshop conducted by NMFS.

On July 5, 2000, NMFS published a proposed rule for the Hawaii-based longline fishery based on the Council's recommended measures. However, the agency did not proceed with the publication of a final rule, as the USFWS had indicated it was developing a Biological Opinion for the fishery action under section 7 of the Endangered Species Act (ESA) for the short-tail albatross. This endangered species has been documented in small numbers in the NWHI, and the USFWS BiOp, published on November 28, 2000, concluded that the Hawaii-based longline fishery as proposed was not likely to jeopardize the continued existence of the short-tailed albatross.

Nevertheless, it included several non-discretionary measures to be employed by the Hawaii-based longline fishery and implemented by NMFS. In contrast to the Council's recommendation requiring the use of any two of the six approved deterrents, the 2000 USFWS BiOp required that all Hawaii-based vessels operating with longline gear north of 23° N. latitude use thawed blue-dyed bait and discard offal strategically to distract birds during setting and hauling of longline gear. In addition, when making deep sets (targeting tuna) north of 23 ° N. latitude, Hawaii-based vessel operators were required to employ a line-setting machine with weighted branch lines (minimum weight = 45 g). All longline vessel operators and crew were also required to follow certain handling techniques to ensure that all seabirds (not just short-tailed albatrosses) would be handled and released in a manner that maximizes the probability of their long-term survival, and vessel operators were required to annually complete a protected species educational workshop conducted by NMFS. Optional mitigation measures include towed deterrents, or the use of weighted branch lines without a line-setting machine (in the case of swordfish or mixed target sets). In addition, operators of Hawaii-based vessels making shallow sets (targeting swordfish) north of 23 ° N. were required to begin the setting process at least one hour after sunset and complete the setting process by sunrise.

The USFWS 2000 BiOp was based on the operations of the Hawaii-based longline fishery prior to December 1999, and anticipated that the fishery would take 15 short-tailed albatrosses during the seven year period addressed in the consultation (2.2 short-tailed albatrosses annually from 2000-2006). This BiOp considered a "take" to include not only injury or mortality to a short-tail albatross caused by longline gear, but also any short-tail albatross striking at the baited hooks or mainline gear during longline setting or haulback.

Emergency and final regulations implementing seabird mitigation measures for the Hawaii-based longline fishery were promulgated on June 12, 2001 and May 14, 2002, respectively. However, the requirements regarding shallow-set longlining north of 23° N. latitude were not implemented by NMFS as, for the purpose of minimizing effects of the fishery on threatened and endangered sea turtle species, on March 31, 2001, by order of the court NMFS prohibited all shallow-set pelagic longline fishing for swordfish north of the equator by Hawaii-based vessels.

The March 31, 2001 closure of the shallow set longline component of the fishery led NMFS to reinitiate consultation under the Endangered Species Act (ESA) with the USFWS on August 15, 2001 to examine the impacts of the reduced fishery on short-tailed albatross. The subsequent 2002 USFWS BiOp was released November 18, 2002, and again concluded that the Hawaii-based longline fishery as proposed was not likely to jeopardize the continued existence of the short-tailed albatross.

In 2003 new information, experimental results and technological advances in longline gear design that concern interactions between the fishery and sea turtles prompted the Council recommend new measures for the Hawaii-based fishery. As a result current regulations allow a limited amount (2,120 sets annually) of shallow set longline effort by Hawaii-based swordfish vessels using circle hooks with mackerel-type bait. Because this action allowed limited shallow setting, the Council also recommended implementation of the 2000 USFWS BiOp requirement that any shallow-setting occurring north of 23° N. latitude be done at night. Final regulations implementing these recommendations were promulgated on April 2, 2004

A series of cooperative research trials with new mitigation methods were conducted between 2002 and 2003 on Hawaii-based longline vessels. The trials found that underwater setting chutes (which deploy baited hooks underwater and out of the reach of seabirds) and side setting (which deploys the longline laterally from amidships, rather than directly over the stern), were both effective in further reducing interactions with seabirds. This document examines a range of alternatives that would allow or require the use of one or more of these techniques to cost-effectively further reduce seabird interactions with the Hawaii-based fishery. Also examined is the use of tori lines (also known as streamer or bird scaring lines) which have been found to be effective in reducing seabird interactions in the Alaska demersal longline fishery.

In October 2004, USFWS published a new BiOp on the reopening of the swordfish segment of the Hawaii-based longline fishery. Although the consultation was concerned primarily with the introduction of circle hooks and mackerel bait in the fishery, and its likely potential impact on the short-tailed albatross, the BiOp also took into consideration the development of new mitigation techniques such as side setting. Consequently, although the BiOP concluded that the fishery was not likely to jeopardize the continued existence of the short-tailed albatross, the reasonable and prudent measures in the USFWS' October 2004 BiOp required NMFS to implement side setting, or other equally more effective measures to minimize the risk of incidental take of short tailed albatrosses by August 30, 2005. In addition to introducing promising new seabird deterrent measures, the Council believes that this regulatory amendment will bring the Pelagics FMP into compliance with the USFWS October 2004 BiOp.

At its 123rd meeting on June 23, 2004, the Council took initial action and selected a preliminary preferred alternative. At its 124th meeting (October 12-15, 2004) the Council took final action and recommended the following action to NMFS:

All shallow-setting longline vessels, wherever they fish, be required to either use side setting, or to use all of the following measures simultaneously: night setting, blue bait, offal discards, and tori lines.

All deep-setting longline vessels, when fishing north of 23 deg N, be required to either use side setting, or to use all of the following measures simultaneously: a line shooter with weighted branch lines, blue bait, offal discards, and tori lines.

The Council will use the period of the regulatory process to collect supplementary data on bird behavior and coordinate with the USFWS to remove the requirement for blue dyed thawed bait and offal discards, if appropriate.

A comment letter on the Draft Environmental Impact Statement prepared by NMFS for this action from the US Department of the Interior (dated October 15, 2004, but delivered after the 124th Council meeting), stated that blue dyed bait and strategic offal discards should be retained as mitigation measures. However, the letter further suggested that strategic offal discards should be used by longline vessels only when seabirds were present. A second letter received from the USFWS on February 24, 2005 in response to a direct request for clarification from the Council, reiterated this position.

Thus the Council's final preferred alternative (7D) recommended to NMFS for approval and implementation is as follows:

A) All deep setting Hawaii-based longline vessels must either side-set, or use a tori line plus the currently required measures (line shooter with weighted branch lines, blue dyed thawed bait and strategic offal discards) when fishing north of 23 ° - with the requirement to use strategic offal discards modified to require that vessel operators use them only when seabirds are present;

AND

B) All shallow setting Hawaii-based longline vessels must either side-set, or use a tori line plus the currently required measures (night setting, blue dyed thawed bait and strategic offal discards) wherever they fish - with the requirement to use strategic offal discards modified to require that vessel operators use them only when seabirds are present.

8.0 Management Alternatives

The primary objective of this management action is the cost-effective further reduction of the potentially harmful effects of fishing by Hawaii-based longline vessels on the short-tailed albatross, but the overarching goal is to reduce the potentially harmful effects of fishing by Hawaii-based longline vessels on all seabirds in a cost-effective manner. Fishery interactions may impact individual seabirds and, if large enough, in turn impact seabird populations so as to alter their trajectory (e.g. from positive to negative).

Mitigation of seabird fishery interactions can be accomplished in a number of ways. One approach is to reduce the physical impacts on seabirds of interactions (e.g. hookings) that do occur, another is to support seabird nesting areas to compensate for fishery impacts, a third is to reduce the size of fisheries operating around seabirds, and a fourth is to reduce the interaction (e.g. hooking) rate by active fisheries. The first approach has been implemented through the design and distribution of seabird handling guidelines to all vessel owners and operators during annual protected species workshops. Attendees review the guidelines and watch a video demonstrating how to safely handle and release hooked or entangled seabirds. To date the Council has not undertaken the conservation of seabird nesting habitat although this could be considered. Reductions in the size of the Hawaii-based longline fishery (e.g. reductions in permits or effort limits) are not being considered at this time as they would not be cost-effective given the low fishery interaction rates, the status of affected seabird populations, and the availability of other mitigation measures. The action proposed here is the result of an examination of a range of new and old seabird deterrent techniques which have been found to reduce the interaction rates between seabirds and the Hawaii-based longline fishery.

There are numerous seabird mitigation techniques developed by fishermen and scientists that are aimed at deterring albatrosses from reaching baited longline hooks. A summary of experimental data on mitigation techniques tested in the North Pacific by Hawaii-based longline vessels is shown in Appendix I. In 1991, Brothers had a fishing master deploy a diversion streamer line and found that it reduced bait loss to birds by 69% (Brothers 1991). Prior to 1991, fishing masters had tried towing buoys, throwing explosives, towing artificial lures and adding weights to sink baits faster (Brothers 1991). Since then additional deterrent measures have been invented (Alexander et al. 1997, Brothers et al. 1999, McNamara et al. 1999, Boggs 2001, Melvin et al. 2001, Gilman et al. 2002, 2003 a, b). All measures, regardless of the details of their design or implementation methodologies, attempt to do one of the following in order to keep albatrosses away from baits:

- Make baits difficult for birds to detect;
- Make baits difficult for birds to reach;
- Frighten, physically deter or draw birds away from baits; or
- Reduce the number of birds congregating around the fishing vessel

The following sections review the characteristics of individual seabird measures considered in formulating a new management regime. The potential measures include those that have been previously considered by the Council or specified by the USFWS in its 2000 BiOp on effects of the fishery (thawed blue-dyed bait, strategic offal discards, line shooter with weighted branch lines, night-setting), as well as a deterrent that has proven effective elsewhere in other fisheries (tori line), and two additional techniques (underwater setting chute and side-setting) which have been found effective in experimental testing.

In evaluating how well the individual seabird interaction avoidance measures and the alternatives, most of which contain more than one such measure, accomplish the action objective, both qualitative and quantitative criteria were used.

Qualitative criteria identified as critical to the successful implementation of seabird interaction avoidance measures are operational characteristics and compliance. Operational characteristics include such things as ease of implementation by crew, consistency of performance across a range of variables including time of day, location, weather, sea state, and seabird density, and effect on target species CPUE. Compliance is a measure of the likelihood of a measure's proper use, the likelihood of its use in the absence of observers, and the relative ease with which it may be enforced.

Two quantitative criteria were also evaluated: efficacy of a measure or combination of measures to deter seabirds from baited hooks and the cost of implementation. All of the measures evaluated here have a high level of efficacy in deterring seabirds from baited hooks, but there are some notable differences among measures. The cost criterion includes both initial costs to fishermen to purchase and install gear and also recurring costs for supplies or maintenance.

This section describes the strategies available to achieve this action's objective. It then evaluates and compares seabird interaction avoidance and deterrent measures and combinations of measures that might be assembled into action alternatives. Finally, it describes the 24 alternatives considered for the fishery and discusses other alternatives not considered in detail.

8.1 Potential Deterrent Measures to Reduce Longline-Seabird Interactions

Blue-dyed and Thawed Bait

Operational characteristics

Blue-dyed bait and thawed bait are actually two deterrent measures that could be evaluated or implemented independently. Blue dye makes bait more difficult for birds to detect, and thawed bait sinks faster, thus more rapidly removing it from the reach of seabirds. In practice it is necessary to thaw or at least partially thaw bait for it to take up the blue dye, and current regulations require the use of thawed and blue-dyed bait when longlining north of 23 °N. Thawed blue-dyed squid and fish bait were used in deterrent efficacy experiments conducted in Hawaii using longline gear and methods typical of the fleet. For these reasons these two measures are combined here. In practice, blue-dying bait has its operational drawbacks. Pre-dyed blue bait is not commercially available, requiring fishermen to dye the bait blue as it is thawed before each set. The use of blue dye is messy, dyeing the hands and clothes of the crew and the deck of the vessel. The use of blue dye also requires the crew to deploy the baited hooks away from the propeller wash, where the white water makes the blue-dyed bait more apparent to seabirds. Crews untrained or unfamiliar with the use of blue-dyed bait may reduce its effectiveness by not deploying baited hooks away from the propeller wash. Thawed bait falls off the hook more readily than firmer, partially frozen bait. Gilman et al. (2003) found that "blue-dyed bait resulted in a relatively low fishing efficiency based on bait retention and hook setting rates."

Compliance

Monitoring compliance with the use of blue-dyed bait is very difficult in the absence of an observer. Vessels can be checked for tins of blue bait by being boarded at sea or during dockside inspections, but this does not ensure that the dye is being used, or used properly. However, Gilman (2004) found, in analyzing PIRO observer data from sets made in 2003 and 2004, that the compliance rate on observed trips was 99%. The compliance rate on unobserved trips is unknown, but Gilman also found that some vessels were voluntarily using thawed blue-dyed bait on sets south of 23 °N.

Efficacy
Blue dye has been shown to be effective at mitigating seabird interactions when used with squid bait, which readily absorbs the dye, and thus disguises the bait on immersion in the sea. For example, McNamara et al. (1999) in tests using Hawaii longline shallow-set (swordfish) gear reported a 77% reduction in gear contacts and a 95% reduction in bird capture rates using blue-dyed squid bait. The shallow-set component of the Hawaii longline fleet formerly used squid for bait, but is now required to use mackerel-type bait, as has been used by the deep-set (tuna) sector of the fishery. As compared to squid, blue dye is taken up less readily by fish baits such as sanma or sardines, and fishermen report difficulty in achieving the desired intensity of blue color as specified in the regulations, due to the shedding of the deciduous scales of the commonly used bait fish. Gilman et al. (2003) tested thawed blue-dyed fish bait with Hawaii tuna longline gear and found a 63% reduction in bird capture. While not as good a deterrent as blue-dyed squid, blue-dyed fish still has substantial deterrent properties. Research on the use of blue dye to minimize interactions with seabirds has been conducted in New Zealand, and Japan (Eric Gilman, Blue Ocean Institute, personal communication). Information on the performance of blue dyed bait in the New Zealand tuna fishery (Greg Lydon, New Zealand Seafood Industry, personal communication to Holly Friefeld, USFWS Honolulu) suggests that sanma is better at absorbing blue dye than sardines, but at sea trials with blue bait have only included squid bait). Results from Japanese fishing trials with blue dyed mackerel bait (Minami & Kiyota 2002) indicated that blue dyed bait eliminated seabird captures entirely when used on longliners targeting southern bluefin tuna.

Cost
There is a cost of about $14.00/set (Gilman et al. 2003) associated with dyeing bait blue in the Hawaii longline fishery. Over the period of a year, a vessel might be expected to make 100 sets, amounting to an annual blue dye cost of $1,400 per vessel.

<u>Strategic Offal Discard</u>
Operational characteristics
Operationally, offal discards are more appropriate for vessels targeting swordfish than tuna, because the carcasses of swordfish are routinely headed and gutted before being packed on ice in the vessel's hold. A supply of offal is therefore routinely generated for the next set. Historically, tuna were not dressed, with only the fins and tails removed before icing. Accumulating offal for the next set on tuna-targeting vessels was thus more problematic. Tunas are now beginning to be dressed at sea on some Hawaii longline tuna vessels so a supply of offal is less problematic for these vessels.

Compliance
Monitoring of compliance with a requirement for strategic offal discards on longline sets is difficult in the absence of an observer. Fishermen may voluntarily use this measure as it has been shown to be effective and has no cost associated with it, particularly for swordfish-targeting

vessels which routinely generate quantities of offal. For tuna-targeting vessels, bycatch may have to be butchered for offal. Gilman (2004), in his analysis of recent Hawaii longline observer data, found that only 18% of tuna-targeting sets employed strategic offal discard.

Efficacy

Offal discards have been shown to be effective in reducing interactions with longlines during the period when lines are set. Offal discards were shown to reduce gear contacts by 51% and captures by 88% in tests by McNamara et al. (1999) with Hawaii longline swordfish gear.

However, there are also mixed evaluations of the effectiveness of strategic offal discharge (Cherel et al. 1996, Brothers 1995 and 1996, McNamara et al. 1999). Although discharging offal and fish bycatch during setting can distract birds from baited hooks (Cherel and Weimerskirch 1995, Cherel et al. 1996, McNamara et al. 1999), this practice is believed to have the disadvantage of attracting birds to the vessel, increasing bird abundance, searching intensity, and capture (Brothers et al. 1999). In the long-term, strategic offal discharge may reinforce the association that birds make with specific longline vessels being a source of food. Brothers (1996) hypothesizes that seabirds learn to recognize by smell specific vessels that provide a source of food, implying that vessels that consistently discharge offal and fish bycatch will have higher seabird abundance and capture rates than vessels that do not discharge offal and fish waste. Nevertheless, in the Hawaii-based fleet the swordfish vessels at least have a supply of offal and routinely discard it.

Cost

There are no financial costs associated with strategic offal discards other than the need to purchase containers in which to store the offal. The cost for containers is estimated at $150 per vessel.

Line-shooter with Weighted Branch Lines

Operational characteristics

Line-shooters and weighted branch lines are two separate seabird interaction avoidance measures that could be (and have been) evaluated independently. Because they are linked in current regulations applicable to the deep-setting sector of the fleet, they are considered together here. Although line-shooters and weighted branch lines (minimum 45g) are required to be used to target deep swimming tuna by Hawaii-based longline vessels, they would likely be used routinely anyway to get the baits deep quickly. Line-shooters function to deploy the longline at a rate faster than that of the vessel, thus creating slack in the line, allowing it to sink without tension. Weighted branch lines serve to sink the baits themselves, which could otherwise linger near the surface until slack is taken up by the sinking main line. Weighted branch lines, however, can be dangerous to crew. When attempting to haul in a live fish, the hook can pull loose or the leader can break, slinging the weight and/or the hook directly towards the fisherman's face. The heavier the weight, the greater the danger. There is anecdotal evidence of serious injuries from 60g weights, although many operators do prefer the heavier weights. As much as 70% of the Hawaii-based fleet now uses the heavier weights (Sean Martin, Hawaii Longline Association [HLA], personal communication). Many operators also now fasten the hook to a section of steel leader to minimize cutting of the monofilament branch line, especially common with hooked sharks (Sean Martin, HLA, personal communication). Vessels targeting tuna in the Hawaii-based fleet universally employ line-shooters, except for one vessel which used traditional tarred rope basket gear, but which has since left the fleet. Line-shooters are not needed when setting shallow for swordfish, however, many vessels in the fleet re-rigged from swordfish fishing to tuna fishing after the 2001 ban on shallow-setting in the fleet. These vessels now have line-shooters, and may continue to use them, albeit somewhat differently than deep-setting vessels. Whereas deep-setting vessels deploy the main line at a speed faster than that of the vessel to allow it to rapidly sink, shallow-setting vessels may deploy the line at the same speed as the vessel, intending that it remain relatively shallow. As noted above, a line shooter with weighted branch lines is standard gear for targeting tuna in the Hawaii-based fleet, and therefore vessels targeting tuna north of 23 °N are automatically complying with this aspect of current regulations. Swordfish-targeting vessels are not required to employ line setters and weighted branch lines , and these measures, which facilitate rapid sinking of the branch lines by removing line tension during the set and adding weights within one meter of each hook, would be inappropriate for their intended shallow sets. A requirement for the swordfish vessels to place weighted swivels within 1 m of the hook would probably not alter the final depth of deployment of the gear, as is stated in this section. This would increase the initial sink rate of the baited hook near the surface and could affect swordfish CPUE. Although a line shooter can be set to run such that it does not set the line slack and thus does not allow the mainline to sink faster than the typical method of mainline deployment for swordfish fishing, fishery participants that did so without shallow set certificates would be fishing illegally and prohibited from possessing or landing more than 10 swordfish per trip.

Compliance

As noted above, a line-shooter and weighted branch lines are standard gear for targeting tuna in the Hawaii-based fleet, and therefore vessels targeting tuna north of 23 °N are automatically complying with this aspect of current regulations. Swordfish-targeting vessels are not required by current regulations to employ line setters or weighted branch lines, but many do.

Efficacy

Boggs (2001) found that adding 60 g of weight to branch lines reduced albatross interactions by 92%. Albatross are surface feeders and do not dive as deeply as plunge divers such as boobies. Baits deeper than a few meters are out of reach of albatrosses. According to Brothers et al. (1995), a frozen bait weighted with about 50 g of lead should sink to three m depth approximately 30 m behind a longline vessel setting at eight knots. The efficacy of a combination of weighted branch lines and a line-shooter at reducing bird capture was estimated to be 97-98% (NMFS, SWFSC Honolulu Laboratory, cited in WPRFMC 2001).

Cost

The cost of a hydraulic line-shooter of the type employed by the Hawaii-based longline fleet and its installation amounts to about $5,700 (Jim Cook, Pacific Ocean Producers, personal communication). Weighted branch lines are estimated to be a recurring annual cost of $2,400 per vessel.

Tori line

Operational characteristics

Tori lines are a type of towed deterrent. Other towed deterrents, including such things as inflated trash bags, have been tried by fishermen, but no data are available on their effectiveness. In general, a tori line is a line suspended from a high pole on the stern of the vessel and extending astern to a buoy or float that keeps the line taught. Streamer lines are attached at intervals along the main line and extend down to the water's surface. Tori lines protect baited hooks which are accessible to seabirds at the water's surface, and force birds to forage further behind the fishing vessel, giving the baits a chance to sink. The effectiveness of tori lines is reduced under conditions where the tori line is not over the baits, such as when winds and currents are in very different directions. In such situations, the effectiveness of a tori line may be improved by rigging a boom and bridal system that allows the line to be shifted laterally to afford better coverage of the main line. Rough seas and high winds may reduce the effectiveness of tori lines and increase the risk of entanglements between the tori line and the main line or branch lines. In addition, McNamara et al. (1999) noted that seabirds themselves occasionally contact branchlines and carry these over the tori line, leading to entanglements. Further, when a longline vessel stops during hauls, the streamers attached to the tori line may cause the tori line to sink, increasing the risk of entanglement with the fishing gear or the vessel's propeller. This and the constant attention needed to ensure the proper functioning of the tori line may increase the risk of accidents or injury to fishermen during setting operations.

Compliance

If vessels elect to use this measure, they can be checked at dockside to ensure that appropriate gear is on board. The deployment of a tori line is also highly visible, allowing at-sea monitoring of compliance from an aircraft or cutter. However, as with blue bait and offal discards, monitoring of compliance at-sea would be problematic in the absence of on-board observers. . Further, monitoring may be problematic even with observers on the vessel. It is not always possible to ensure that the method is being used effectively, resulting in a tori line being deployed but not over the area of baited hooks. This may result in compliance with the regulations, but negate its effect in avoiding bird capture.

Efficacy

McNamara et al. (1999) and Boggs (2001) evaluated the effectiveness of towed deterrents, including tori lines on Hawaii-based longline vessels and using a research vessel, respectively. The observations conducted by those investigators were on longline gear rigged to fish shallow for swordfish. In the McNamara study, tori lines reduced seabird captures by 79% and towed buoys reduced captures by 88%. In the Boggs study, tori lines reduced contacts with the line by 76%.

Cost

The equipment for a tori line amounts to about $2,000 for the fiberglass pole and $300 for the line and streamers. Installation of a mount for the tori line is estimated to cost about $1,000. Total initial costs associated with a single tori line are thus likely to be about $3,300. Assuming that vessel operators replace one to two units per year and keep a spare unit on board at all times, annual costs would be $4,600.

Night-setting

Operational characteristics

This measure is predicated on birds' inability to see gear and bait in the dark, so its effectiveness likely is influenced by cloud cover, moon phase, vessel lighting and use of light sticks. Hooks set at or before dusk, however, are a threat to crepuscular feeders such as albatross. Setting longlines at night has historically been part of the standard operating procedures for Hawaii-based longline vessels making shallow-sets targeting swordfish. However, some operators in the Hawaii-based fleet historically set their hooks according to a lunar calendar and that sometimes resulted in pre-dusk setting. Consequently, the observer data (and estimated seabird interactions) for the period 1994-1999 (prior to implementation of the current definition of and requirement for nighttime shallow sets) represents a mixture of pre-dusk and true night-setting. There is a common belief among some fishermen that the hooks deployed before dark are generally more effective than those set after dusk (Brian MacNamara, personal communication).

Compliance

Vessels opting to target swordfish in the shallow-set sector of the fishery reauthorized in 2004 will have to declare their intent to make shallow-sets prior to departure. They will be required to carry an observer, who will note the start and finish times of sets as part of their duties, and therefore establish a record of compliance with the requirements for the timing of the start and termination of sets. Should observer coverage be reduced in the future, data collected via the VMS system could be used to verify the start and finish of setting and hauling. VMS position checks can be made at intervals well under an hour and as frequently as every five minutes (Sean Martin, Hawaii Longline Association, personal communication.)

Efficacy

Unlike the other measures considered here, which tend to work similarly on Laysan and black-footed albatross, night-setting is more effective at minimizing interactions with black-footed albatross than with Laysan albatross, which may continue to feed after dark and therefore may dive on baited hooks being deployed after dusk. McNamara et al. (1999) found that black-footed albatross captures were reduced by 95%, but Laysan albatross captures were only reduced by 40%. Boggs (2003) found that shallow-setting at night reduced overall captures by 98% and contacts by 93%.

Cost

There are no additional financial costs known to be specifically associated with night-setting, however, when fishing at high latitudes in summer, nights are short, night-setting gives fishermen less time to set gear.

Underwater Setting Chute

Operational characteristics

Two lengths of chutes (9m and 6.5m) used by Gilman et al. (2003) in experiments in Hawaii using deep-set gear were found to have design flaws that affected their performance. The 9m chute fractured and bent on one fishing trip, and even when repaired had a markedly reduced performance operationally and in terms of mitigating seabird interactions. Even the shorter chute, however, requires a lot of deck space to stow when not fishing and in transit to and from fishing grounds, which may be a problem on smaller vessels. An additional problem noted by Gilman et al. (2003) is that the chutes tested caused delays in setting the branch lines that could reduce the number of hooks deployed per set by 12.5% for the 9m long chute and 28.8% for the 6.5m long chute. However, the reduced hook setting rate when using the chute would only be a problem for longline tuna vessels, and not for longline swordfish vessels, due to their conventional hook setting speeds.

Compliance

The deployment of an underwater setting chute could be monitored from an aircraft or cutter. However, as with several other potential measures, monitoring of compliance at-sea would be problematic in the absence of on-board observers. The presence of a setting chute on-board a vessel at the dock does not insure its use at sea, although an electronic hook counter could be fixed to the chute to monitor the deployed through the setting chute.

Efficacy

Trials with underwater setting chutes on Hawaii-based longline vessels have been conducted by Gilman et al. (2002, 2003). Initial trials with a 9m chute in the longline tuna fishery, where the chute deployed baited hooks 5.4m underwater, eliminated bird captures.

Cost

The acquisition of an underwater setting chute is a significant expense, currently estimated to be about $5,000, with additional costs estimated at $1,000 for installation of mounts and hardware.

Side-setting

Operational characteristics

Side setting under experimental conditions has been shown to virtually eliminate bird capture (Gilman 2003b). In trials conducted by Gilman et al. (2003b) during 22 deep-sets, side setting was also shown to perform significantly better at reducing interactions and mortalities than sets with two lengths of underwater setting chutes or with blue-dyed bait (Table1). More recently, observer data (August 2003 – October 2004) analyzed by Gilman (2004) indicates that 21 sets where side setting was employed did not record a single seabird capture. However caution must be exercised when looking at observer data which, unlike experimental data, merely record the presence or absence of seabirds and do not normalize the data for bird abundance. Side-setting minimizes bait theft and bird capture, thus increasing fishing efficiency. Vessels with the wheel house positioned amidships or aft of the vessel conventionally set their lines from the aft deck, and retrieve the line from the foredeck. All the retrieved gear is then carried manually to the aft deck for baiting and setting, reducing the work load for fishermen.

As noted in the discussion of line-shooters above, some fishermen have safety concerns about the 60 g weights as recommended for use with side-setting by Gilman et al. (2003). Nevertheless, it is estimated that about 70% of the vessels currently fishing in Hawaii already use 60g weighted swivels (Sean Martin, HLA, personal communication), while other vessels are still using the currently required (minimum) 45g weights when deep-set fishing north of 23 °N.

Promising as side setting appears to be there are compelling reasons to take a more cautious approach and maintain an element of flexibility in the methods available to operators in the Hawaii-based longline fishery. Experience in the Alaska demersal longline fishery has shown that a stepwise approach may be more "prudent" (Kim Rivera, NMFS, North Pacific Region, personal communication). Although mitigation measures can be shown to be effective under experimental conditions, their performance characteristics need to be evaluated under operational conditions during routine fishing operations through the use of on-board observations (Kim Rivera, NMFS, North Pacific Region, personal communication). A wholesale conversion to side setting by one or more fishery sectors would effectively remove the "control" portion of the sector and the information to be gained from a "with and without" comparison would be lost and further systematic evaluation of this technique would be difficult (Christofer Boggs, PIFSC, personal communication). In addition, should seabirds prove to become habituated to side setting, its effectiveness would be lost and vessels would have undergone reconfigurations for little purpose.

Compliance

Side-setting is relatively easy to enforce as the orientation of the gear on deck can be checked through dockside inspection, and vessel operations can be readily observed at sea. It would be relatively easy to reconfigure a vessel from side-setting to stern-setting while at sea, especially for shallow setting vessels which do not employ a mainline shooter. However, because of the operational benefits described above there would seem little motivation to do so. Moreover, vessels must notify NMFS and carry observers when shallow setting. If NMFS is not notified and no observer is carried, regulations prohibit the possession or landing of more than 10 swordfish per trip. Thus there would be little opportunity or incentive for vessel operators to reconfigure their vessel while at sea. To date approximately 15 vessels (more than 12% of the fleet) have voluntarily made the conversion to side-setting (Sean Martin, HLA, personal communication), presumably due to the operational benefits noted above.

Efficacy

Side-setting has been shown to virtually eliminate bird capture. In shallow set and deep-set trials conducted by Gilman et al. (2003), side-setting was shown to perform significantly better at reducing interactions and mortalities than sets with the two lengths of underwater setting chutes or with blue-dyed bait.

Cost

Conversion to side-setting means that all operations can be conducted from the foredeck with the elimination of the gear transfer between sets. The initial expense of adjusting the vessel deck design, fabricating or purchasing a bird curtain, and switching from 45g to 60g weighted swivels is estimated to be about $4,000, with an annual cost of $50 to replace the bird curtain.

Summary Comparison of Potential Seabird Deterrent Measures

Table 1 grades the seabird interaction avoidance measures on the basis of the qualitative criteria described above. Due to the qualitative nature of the criteria, these grades are necessarily subjective. Table 2 summarizes the costs per fishing vessel associated with each measure.

Table 1 Summary of Qualitative Appraisals of Deterrent Measures
(●= good; ●●= better; ●●●=best)

Deterrent Measure	Evaluation Criteria	
	Operational Characteristics	**Compliance**
Thawed blue-dyed bait	●●	●
Strategic offal discards	●◖	●
Line-shooter with weighted branch lines (on tuna vessels)	●●●	●●●
Tori line	●	●
Night-setting (on swordfish vessels)	●●	●●
Underwater setting chute	●	●
Side-setting (+ 60g swivels within 1m of the hook)	●●◖	●●●

Table 2 Summary of Costs per Vessel for Deterrent Measures

Deterrent Measure	Cost per Vessel
Thawed blue-dyed bait	$1,400 annual
Strategic offal discards	$150 initial plus $150 annual
Line-shooter with weighted branch lines (on tuna vessels)	already purchased and being used ($5,700 initial plus $2,400 annual)
Tori line	$3,300 initial plus $4,600 annual (2 lines)
Night-setting (on swordfish vessels)	$0
Underwater setting chute	$6,000 initial
Side-setting (+ 60g swivels within 1m of the hook)	$4,000 initial plus $50 annual

The results of seabird mitigation experiments conducted in the North Pacific aboard Hawaii-based longline vessels are shown in Appendix I and summarized in Table 3. Table 3 includes the reduction in seabird capture rates for measures discussed above and included in the alternatives presented later in this chapter. The percent reductions are relative to a no-mitigation measure baseline, however in the case of deep setting tuna vessels the baseline includes a line shooter with weighted branch lines as this is the norm for these vessels. The bolded values in Table 3 were used in estimating the efficacy or percent reduction in seabird interactions (compared to no-mitigation conditions) of combined measures and potential seabird takes under each alternative. Most experiments used shallow sets and those values are likely conservative for deep sets in which line shooters are used and the weights are closer to the baited hook, causing them to sink more rapidly out of the reach of seabirds (Boggs 2001) and most of which are made to the south of the Hawaiian Islands beyond the normal range of Laysan and blackfooted albatrosses. References for the experiments are provided and rationales for the values are provided in the comments columns. All of these data and results of experiments with other deterrents are summarized in Gilman et al. (2003a). Data is presented in terms of percent changes from the baseline in order to provide an easy comparison of the efficacy of each measure.

Table 3 Deterrent Measure Efficacy Values From Experiments Conducted in the Hawaii-based Longline Fishery

Measure	Tuna (Deep) Set	Reference	Comments	Swordfish (Shallow) Set	Reference	Comments
Thawed Blue-Dyed Bait (Squid) (TBDB)	Not applicable	---	Squid bait not used for tuna	95%	McNamara 1999	Squid bait no longer permitted.
Thawed Blue-Dyed Bait (Fish) (TBDB)	**(63%)**	---	Use SF efficiency for tuna. Appears conservative for deep sets.	**63%**	Gilman et al. 2003	
Strategic Offal Discharge (SOD)	**(86%)**	---	Use SF efficiency for tuna. Appears conservative for deep sets.	**86%**	McNamara 1999	
Night-setting (NS)	Not applicable	---	Night-setting not used for tuna.	73% 98% Mean = **85.5%**	McNamara 1999 Boggs 2003	Mean value of two studies used in calculations.
Night-setting + Thawed Blue-Dyed Squid	Not applicable	---	Neither night-setting nor squid bait used for tuna.	100%	Boggs 2003	Squid bait no longer permitted.
Underwater Setting Chute (USC)	88% (6.5m) 100% (9m) Mean = **94%**	Gilman et al. 2003	Assumes fully functional chutes.	**(94%)**	---	Assumes chute functionality equal to deep sets.
Single Tori Line (TL)	**(79 %)**	---	Use SF efficiency for tuna. Appears conservative for deep sets.	**79%**	McNamara 1999	
Paired Tori Lines	No data	---		No data	---	
Side Setting (SS)	**(99.8%)**	---	Use SF efficiency for tuna. Appears conservative for deep sets.	99.6-100% Mean = **99.8%**	Gilman et al. 2003	

It can be seen that most measures are very effective at reducing capture of seabirds, achieving 63% reductions or greater, as compared to fishing without any seabird mitigation measures. Caution should be exercised in comparing the quantitative results of different techniques, however, as they were tested under a variety of conditions, seabird densities, on different fishing platforms, and under different experimental protocols. Moreover, the variances about the point estimates are very wide and overlapping in many cases (Christofer Boggs, PIFSC, personal communication). Nevertheless, these are the best estimates we have of both absolute and relative efficacies of the measures under consideration, and these values are used later in this chapter to estimate seabird captures under the various alternatives.

Any discussion of the efficacy of seabird mitigation measures should also acknowledge the impact of captured bird drop-offs, and the need to normalize capture rates of seabirds relative to the abundance of seabirds around a fishing vessel. The absolute number of birds counted in experimental observations is subject to error from drop-offs or loss by predation of hooked and drowned birds from the longline. However, assuming that bird drop-off and loss rates are constant, this will not affect the relative comparison between different methods and controls. Estimates of drop-offs and loss in the Hawaii longline fishery have been made by Gilman et al. (2003) who found that 28% fewer birds were hauled aboard than were observed being caught during setting. This is consistent with observations by Brothers (1991) who observed 27% fewer birds on hauls than observed on sets in the Japanese tuna longline fishery in the Southern Ocean. Ward et al. (2004) analyzing observer data from a number of longline fisheries showed that the drop-off and loss of seabirds may be as high as 45% and is related to the length of longline soak time.

The results in Table 3 are from experiments conducted on a NMFS research vessel and on a commercial longline vessel, with detailed information recorded on interactions. In both instances the number of seabirds around the vessel was recorded along with the number of attempts and contacts with bait and/or the fishing line, and captures of seabirds. In contrast, observers deployed by NMFS on Hawaii-based longline vessels record seabird abundance within about 150 m of the vessel or around the gear at variable times during a fishing trip. However, most observations of seabird abundance were made by the observers during the haul, which typically occur during the afternoon and at night in the Hawaii longline tuna fleet. Albatross abundance is generally lower at night than during the day. It is also very difficult to accurately estimate bird abundance around the vessel in the dark (McNamara et al., 1999). As such, historical observer data collected by NMFS cannot be treated in the same way as experimental data when looking at the efficacy of different methods.

8.2 Potential Combinations of Deterrent Measures

This section qualitatively examines combinations of the available deterrent measures to see if any combinations would be an obvious improvement over single deterrent measures. Table 4 is a matrix for combining individual seabird deterrent measures for evaluation of all possible pairs of measures. Combinations are discussed by number in the paragraphs below as is the issue of whether individual measures would be anticipated to perform independently of each other (and thus tend to have an additive or cumulative effective) or whether they would interact with each other (either positively or negatively). Quantitative estimates of the efficacies of combinations of measures appearing in the alternatives are made in the next section.

Table 4 Seabird deterrent matrix

Deterrent Measure	Thawed Blue Bait	Strategic Offal Discard	Line-shooter	Tori line	Night-setting	Setting Chute	Side Setting
Thawed Blue Bait	Individual deterrent characteristics	1	2	3	4	5	6
Strategic Offal Discard		Individual deterrent characteristics	7	8	9	10	11
Line-shooter			Individual deterrent characteristics	12	13	14	15
Tori line				Individual deterrent characteristics	16	17	18
Night-setting					Individual deterrent characteristics	19	20
Setting Chute						Individual deterrent characteristics	21
Side Setting							Individual deterrent characteristics

<u>Combination 1:</u> Blue-dyed and thawed bait with strategic offal discard
These measures are independent of each other, and would tend to be additive in their deterrent effects. Both measures have merits, however each has intrinsic limitations in the current fishery, as described above. Blue dye is not as effective for coloring fish as it is for squid. Tests in New Zealand showed that dye uptake in bait fish was poorest for pilchards, most like mackerel of the baits tested (Holly Freifeld, USFWS, personal communication). Strategic offal discards may condition birds to associate longline vessels with food, thereby attracting more birds to the vessel and increasing the risk of interactions.

<u>Combination 2:</u> Blue-dyed and thawed bait with line-shooter and weighted branchlines (minimum 45g)
The measures are independent, and would tend to be additive in their deterrent effects. However, line-shooters previously have not been required for shallow-setting in the Hawaii longline fishery, and blue dye is not as effective with the mackerel-type bait now required for shallow-sets as it was with the squid formerly used as bait for swordfish.

<u>Combination 3:</u> Blue-dyed and thawed bait with tori line
There is anecdotal evidence that some Hawaii-based longline vessels employ tori lines in some circumstances, although this measure may have reduced effectiveness in the rough waters fished by this fleet. These two measures are independent, and would tend to be additive in their deterrent effects, however, blue dye is not as effective with the mackerel-type bait now required

for shallow-sets as it was with the squid formerly used as bait, and tori lines present a risk of entanglement with the main line or the propeller.

Combination 4: Blue-dyed and thawed bait with night-setting
The measures are independent of each other, and would tend to be additive in their deterrent effects, although blue bait may be unnecessary during darker moon phases or periods of high cloud cover, and blue dye is not as effective with the mackerel-type bait now required for shallow sets as it was with the squid formerly used as bait.

Combination 5: Blue-dyed and thawed bait with setting chute
The measures are independent of each other, and would tend to be additive in their deterrent effects. Blue dye is not as effective with the mackerel-type bait now required for shallow-sets as it was with the squid formerly used as bait. The setting chute, as tested to date, has design deficiencies that make it operationally problematic.

Combination 6: Blue-dyed and thawed bait with side setting
The measures are independent of each other, and would tend to be additive in their deterrent effects. Blue dye is not as effective with the mackerel-type bait now required for shallow-sets as it was with the squid formerly used as bait.

Combination 7: Strategic offal discard with line shooter
The measures are independent of each other, and would tend to be additive in their deterrent effects. Strategic offal discard is effective in luring birds away from the baits, but as noted above, may condition birds to approach longline vessels.

Combination 8: Strategic offal discard with tori line
There is anecdotal evidence that some Hawaii-based longline vessels employ tori lines in some circumstances. The measures are independent of each other, and would tend to be additive in their deterrent effects. Strategic offal discard is effective in luring birds away from the baits, but as noted above, may condition birds to approach longline vessels, and tori lines present a risk of entanglement with the main line or the propeller.

Combination 9: Strategic offal discard with night-setting
The measures are independent of each other, and would tend to be additive in their deterrent effects. However, to the extent birds discontinue feeding at night, strategic offal discard would presumably be less effective (although albatrosses have a well developed sense of smell) and, as noted above, may condition birds to approach longline vessels.

Combination 10: Strategic offal discard with setting chute
The measures are independent of each other, and would tend to be additive in their deterrent effects. Strategic offal discard is effective in luring birds away from the baits, but as noted above, may condition birds to approach longline vessels. The setting chute, as tested to date, has design deficiencies that make it operationally problematic.

Combination 11: Strategic offal discard with side setting
The measures are independent of each other, and would tend to be additive in their deterrent effects. Strategic offal discard is effective in luring birds away from the baits, but as noted above, may condition birds to approach longline vessels.

Combination 12: Line-shooter with tori line
The measures are independent of each other, and would tend to be additive in their deterrent effects. The slack put into the main line by the line shooter increases the risk of it tangling with the tori line under rough or windy conditions.

Combination 13: Line-shooter with night-setting
The measures are independent of each other, and would tend to be additive in their deterrent effects. Operationally however, line-shooters are used for deep, tuna sets which are done during daylight hours, and night-setting is done for shallow swordfish sets. The combination is not a practical one for either sector of the fleet, and does not appear in any of the alternatives.

Combination 14: Line-shooter with setting chute
The measures would not be independent, as the hook end of the branch line would be shot through the chute. Although tests of the setting chute were performed using a line shooter, the chute has design deficiencies that make it operationally problematic.

Combination 15: Line-shooter with side setting
The measures would not be independent, as the line-shooter would deploy line from the side of the vessel. This is how the line shooter was tested by Gilman, et al. (2003b), and it worked very well.

Combination 16: Tori line with night-setting
The measures are independent of each other, and would tend to be additive in their deterrent effects. Towing a deterrent at night when visibility is limited, however, would exacerbate the problems associated with keeping it clear of the main line or fouling with the propeller. The incremental improvement in deterrence over night-setting alone is likely to be small.

Combination 17: Tori line with setting chute
The measures are independent of each other, and would tend to be additive in their deterrent effects. However, the setting chute, as tested to date, has design deficiencies that make it operationally problematic.

Combination 18: Tori line with side setting
The measures are independent of each other, but it's unclear what would be the additive product of the deterrent effects. The tori line would have to be mounted from the bow or side of the vessel where the main line is being set. Such a deployment of a tori line on Hawaii-based longline vessels has not been tested.

Combination 19: Night-setting with setting chute
The measures are independent of each other, and would tend to be additive in their deterrent effects. The setting chute, as tested to date, has design deficiencies that make it operationally problematic.

Combination 20: Night-setting with side setting
The measures are independent of each other, and would tend to be additive in their deterrent effects.

Combination 21: Setting chute with side setting
In combination, these measures would not be independent, and this is an unlikely combination operationally as the chute would have to be mounted from the side in a manner so that it faces towards the stern. Limited testing of chutes in the Hawaii-based longline fishery resulted in structural failures however this may have been due to poor chute construction. Chute performance with side setting is untested and unknown.

Summary of Potential Combinations of Deterrent Measures

Considering the above assessments, an attempt was made to qualitatively rank the combinations relative to one another. Combination 21 (setting chute with side setting) was discarded as mechanically unworkable. Combination 18 (tori line with side setting) was discarded as not providing added deterrence over side setting alone. In general, combinations involving side setting faired best, but every combination had liabilities of one sort or another. Specifically, combinations employing blue bait suffered from the decreased performance of the dye on fish as compared with squid. Strategic offal discards may ultimately serve to attract more birds to the vicinity of the longline vessels. Line shooters work well for deep-sets, but are inappropriate for shallow-sets. Tori lines can be problematic operationally. Night-setting is appropriate for shallow-sets but not for deep-sets. For the setting chute to be a reliable, convenient measure, additional design development is required to resolve the difficulties encountered in testing of the prototypes.

In consideration of the above, a wide variety of alternatives are presented below. These alternatives are generally of the form where vessels may use the current suite of measures or one of the individual measures above, but alternatives are offered which also consider requiring side setting and dropping blue-dyed bait and strategic offal discard from the default suite of measures. I would not recommend that all vessels be required to side set at this point. It might be argued that since side setting effectively reduces seabird interactions to zero, that the Council should simply require all vessels to convert to side setting. Promising as side setting appears to be, however, there are compelling reasons to take a more cautious approach and maintain an element of flexibility in the methods available to operators in the Hawaii-based longline fishery. Experience in the Alaska demersal longline fishery has shown that a stepwise approach may be more "prudent "(Kim Rivera, NMFS, North Pacific Region, personal communication). Although mitigation measures can be shown to be effective under experimental conditions, their performance characteristics need to be evaluated under operational conditions during routine fishing operations, through the use of on-board observations. Such information has already been collected in the Hawaii fishery for measures such as blue dyed bait and strategic offal discards (Gilman 2004).

8.3 Alternatives for Reduction of Seabird Interactions in the Hawaii-based Longline Fishery

In this section a range of alternatives for mitigating seabird interactions in the Hawaii longline fishery are presented. The "no action" alternative means maintaining the current suite of measures implemented by current regulations. The action alternatives consist of a range of combinations of seabird deterrent measures as discussed above, and all alternatives would maintain the current requirements for Hawaii-based longline vessel owners and operators to follow seabird handling regulations and to annually attend a NMFS protected species workshop. As described in Section 7, at its 124th meeting (October 12-15, 2004) the Council took under advisement the possibility of deleting the thawed blue-dyed bait and strategic offal discard requirements from the preferred alternative, however this issue was resolved by receipt of a letter dated October 15, 2004 from the Department of the Interior to NMFS which clarified the USFWS position on these measures and the Council's final preferred alternative is described below as Alternative 7D.

<u>Alternative 1 No Action:</u> *Use current mitigation measures when fishing north of 23 °N.*

The current measures appear in Section 660 of Title 50 of the Code of Federal Regulations as follows:

(a) Seabird mitigation techniques. Owners and operators of vessels registered for use under a Hawaii longline limited access permit must ensure that the following actions are taken when fishing north of 23° N. lat.:

(1) Employ a line setting machine or line shooter to set the main longline when making deep sets using monofilament main longline;

(2) Attach a weight of at least 45 g to each branch line within 1 m of the hook when making deep sets using monofilament main longline;

(3) When using basket-style longline gear, ensure that the main longline is deployed slack to maximize its sink rate;

(4) Use completely thawed bait that has been dyed blue to an intensity level specified by a color quality control card issued by NMFS;

(5) Maintain a minimum of two cans (each sold as 0.45 kg or 1 lb size) containing blue dye on board the vessel;

(6) Discharge fish, fish parts (offal), or spent bait while setting or hauling longline gear, on the opposite side of the vessel from where the longline gear is being set or hauled;

(7) Retain sufficient quantities of fish, fish parts, or spent bait, between the setting of longline gear for the purpose of strategically discharging it in accordance with paragraph (a)(6) of this section;

(8) Remove all hooks from fish, fish parts, or spent bait prior to its discharge in accordance with paragraph (a)(6) of this section; and

(9) Remove the bill and liver of any swordfish that is caught, sever its head from the trunk and cut it in half vertically, and periodically discharge the butchered heads and livers in accordance with paragraph (a)(6) of this section.

(10) When shallow-setting north of 23° N. lat., begin the deployment of longline gear at least one hour after local sunset and complete the deployment no later than local sunrise, using only the minimum vessel lights necessary for safety.

(b) *Short-tailed albatross handling techniques.* If a short-tailed albatross is hooked or entangled by a vessel registered for use under a Hawaii longline limited access permit, owners and operators must ensure that the following actions are taken:

(1) Stop the vessel to reduce the tension on the line and bring the bird on board the vessel using a dip net;

(2) Cover the bird with a towel to protect its feathers from oils or damage while being handled;

(3) Remove any entangled lines from the bird;

(4) Determine if the bird is alive or dead.

(i) If dead, freeze the bird immediately with an identification tag attached directly to the specimen listing the species, location and date of mortality, and band number if the bird has a leg band. Attach a duplicate identification tag to the bag or container holding the bird. Any leg bands present must remain on the bird. Contact NMFS, the Coast Guard, or the U.S. Fish and Wildlife Service at the numbers listed on the Short-tailed Albatross Handling Placard distributed at the NMFS protected species workshop, inform them that you have a dead short-tailed albatross on board, and submit the bird to NMFS within 72 hours following completion of the fishing trip.

(ii) If alive, handle the bird in accordance with paragraphs (b)(5) through (b)(10) of this section.

(5) Place the bird in a safe enclosed place;

(6) Immediately contact NMFS, the Coast Guard, or the U.S. Fish and Wildlife Service at the numbers listed on the Short-tailed Albatross Handling Placard distributed at the NMFS protected species workshop and request veterinary guidance;

(7) Follow the veterinary guidance regarding the handling and release of the bird.

(8) Complete the short-tailed albatross recovery data form issued by NMFS.

(9) If the bird is externally hooked and no veterinary guidance is received within 24–48 hours, handle the bird in accordance with paragraphs (c)(4) and (c)(5) of this section, and release the bird only if it meets the following criteria:

(i) Able to hold its head erect and respond to noise and motion stimuli;

(ii) Able to breathe without noise;

(iii) Capable of flapping and retracting both wings to normal folded position on its back;

(iv) Able to stand on both feet with toes pointed forward; and

(v) Feathers are dry.

(10) If released under paragraph (a)(8) of this section or under the guidance of a veterinarian, all released birds must be placed on the sea surface.

(11) If the hook has been ingested or is inaccessible, keep the bird in a safe, enclosed place and submit it to NMFS immediately upon the vessel's return to port. Do not give the bird food or water.

(12) Complete the short-tailed albatross recovery data form issued by NMFS.

(c) *Non-short-tailed albatross seabird handling techniques.* If a seabird other than a short-tailed albatross is hooked or entangled by a vessel registered for use under a Hawaii longline limited access permit owners and operators must ensure that the following actions are taken:

(1) Stop the vessel to reduce the tension on the line and bring the seabird on board the vessel using a dip net;

(2) Cover the seabird with a towel to protect its feathers from oils or damage while being handled;

(3) Remove any entangled lines from the seabird;

(4) Remove any external hooks by cutting the line as close as possible to the hook, pushing the hook barb out point first, cutting off the hook barb using bolt cutters, and then removing the hook shank;

(5) Cut the fishing line as close as possible to ingested or inaccessible hooks;

(6) Leave the bird in a safe enclosed space to recover until its feathers are dry; and

(7) After recovered, release seabirds by placing them on the sea surface.

In addition all Hawaii-based longline vessel owners and operators must attend an annual NMFS protected species workshop.

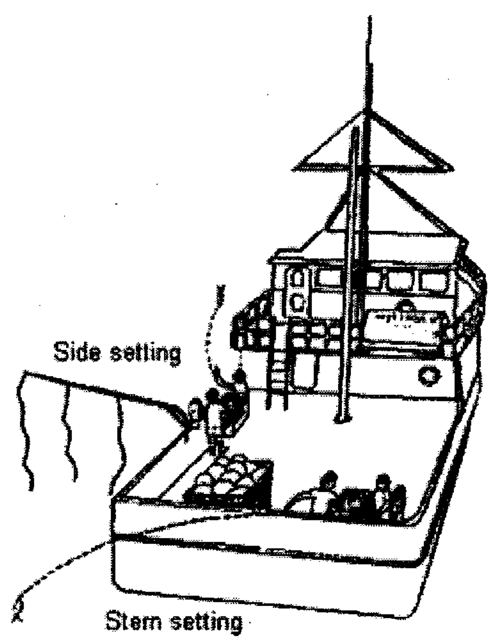
<u>Alternative 2A</u>: *Use current mitigation measures <u>or</u> use side setting, when fishing north of 23 °N.*

Under this alternative, operators of Hawaii-based longline vessels could elect to either (a) continue to use the current measures described above, or (b) employ side setting with 60g swivels within 1m of the hook according to the specifications below, when fishing north of 23 °N. Allowing vessel operators to choose between the current measures or side setting would increase flexibility and address safety concerns by offering the choice of current measures for those vessel operators unwilling to switch to 60 g weights. It also allows for the possibility that not all vessels can be configured for side setting.

For the purposes of this document and analysis, when side setting vessel operators would be required to comply with the following specifications:

Side set as far forward from the stern as possible
Deploy a bird curtain between the setting position and the stern
Throw baited hooks forward as close to the vessel hull as possible
Clip deployed branchlines to the mainline the moment that the vessel passes the baited hook to minimize tension in the branch line, which could cause the baited hook to be pulled towards the sea surface

Figure 1 Stern-and Side-setting Deck Positions (Source: Gilman et al. 2003)



<u>Alternative 2B</u>: Use current mitigation measures <u>or</u> use side setting, in all areas.

Under this alternative, operators of Hawaii-based longline vessels could elect to either (a) continue to use the current measures described above, or (b) employ side setting with 60g swivels within 1m of the hook according to the specifications above, in all areas.

<u>Alternative 3A:</u> Use current mitigation measures <u>or</u> use an underwater setting chute, when fishing north of 23 °N.
Under this alternative, operators of Hawaii-based longline vessels could elect to either (a) continue to use the current measures described above, or (b) use an underwater setting chute that has a minimum of 2.9m of its shaft underwater, when fishing north of 23 °N.

<u>Alternative 3B:</u> Use current mitigation measures <u>or</u> use an underwater setting chute, in all areas.

Under this alternative, operators of Hawaii-based longline vessels could elect to either (a) continue to use the current measures described above, or (b) use an underwater setting chute that has a minimum of 2.9m of its shaft underwater, in all areas.

<u>Alternative 4A:</u> Use current mitigation measures <u>or</u> use a tori line (e.g., paired streamer lines), when fishing north of 23 °N.

Under this alternative, operators of Hawaii-based longline vessels could elect to either (a) continue to use the current measures described above, or (b) employ one or more tori lines according to the general design used by McNamara et al. (1999) and Boggs (2001), when fishing north of 23 °N. Boggs (2001) and McNamara et al (1999) both provided specifications for single tori lines that were effective in reducing interactions with seabirds in their studies. In the study conducted by Boggs, a 150 m tori line comprised a 10 m attachment made of 6 mm yellow twisted polypropylene; a 40 m aerial streamer segment made of the same material with seven forked branch streamers, an 85 m x 3 mm red twisted nylon trailing segment with 8 small streamers on the first 40 m and a 15 m x 12 mm yellow twisted polypropylene drogue segment. The streamer line was flown from a commercially manufactured fiberglass pole mounted 4 m forward of the stern, extending 10 m above the water and 2 m outboard. The streamer line was about 8 m high at the stern and the ends of the first forked streamer dangled just above the water, 10 m behind the stern, about 5 m directly aft of the bait entry point. It is important to note, however, that Boggs' study was conducted aboard a NMFS research vessel, thus the mounting of the tori line is higher than would be possible onboard a commercial longline vessel.

In McNamara et al.'s (1999) study, the tori line varied from 140 -175 m in length depending on the zone of opportunity established for individual vessels. The line consisted of ¼ inch three strand polypropylene line, and six detachable aerial streamers. The aerial streamers were made of flexible material that moved just above the water's surface. The portion of the tori line that trailed in the water had short (10-25 cm) plastic streamers. The tori line that trailed in the water had short (10-25 cm) plastic streamers. The tori line incorporated a ½ inch hollow braid polypropylene drogue section at the terminal end. The tori line was positioned directly above the area where baited hooks were deployed. The height of the attachment point, length of the tori line, and weight of the aerial streamers determined the distance that the aerial streamer portion of the line remained aloft behind the vessel. A tori line of similar length specifications (140 -175m) was also deployed with a buoy at the end of the line, and with 1 m long plastic aerial streamers, and 10 inch water streamers.

Both Boggs (2001) and McNamara et al (1999) based the design of the tori lines used in their respective studies on tori lines used aboard pelagic longliners in the southern bluefin tuna fishery (Brothers et al (1994).

Figure 2 provides an example of a vessel using a tori line.

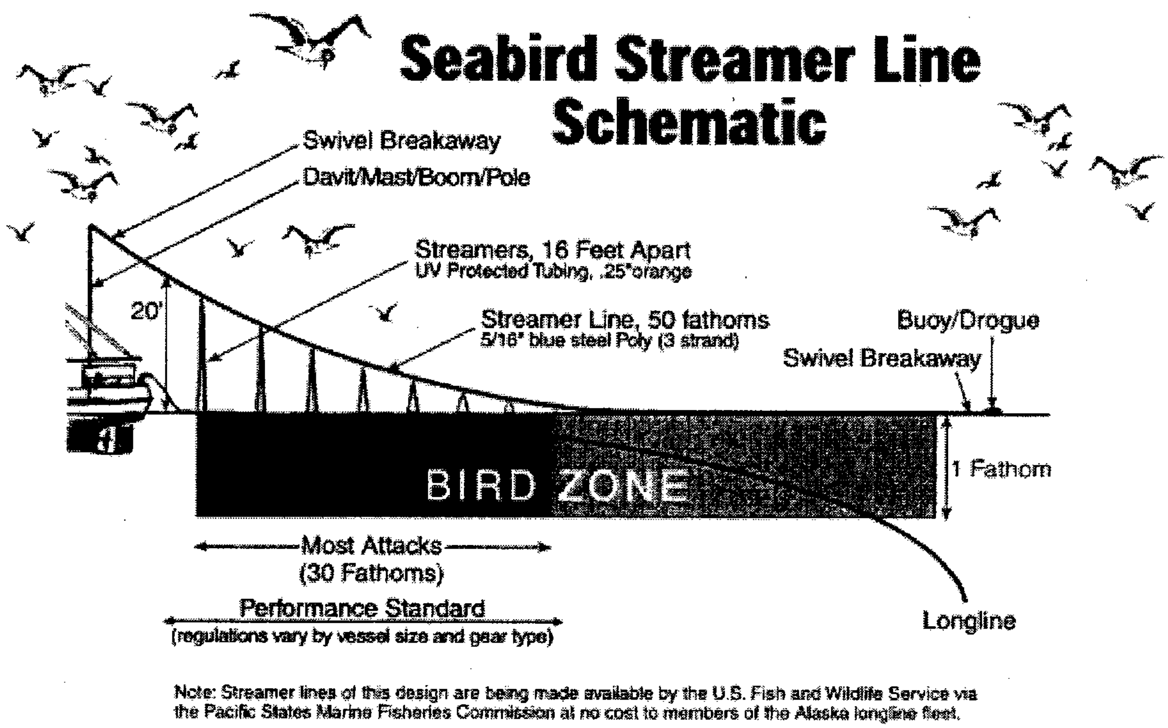


Figure 2 Schematic of a Tori Line Used in the Alaska Demersal Longline Fishery (Source: Melvin 2000)

Alternative 4B: Use current mitigation measures or use a tori line (e.g., paired streamer lines), in all areas.

Under this alternative, operators of Hawaii-based longline vessels could elect to either (a) continue to use the current measures described above, or (b) employ one or more tori lines according to the general design used by McNamara et al. (1999) and Boggs (2001), in all areas.

Alternative 5A: Use current mitigation measures or use side setting or use an underwater setting chute, when fishing north of 23 °N.

Under this alternative, operators of Hawaii-based longline vessels could elect to either (a) continue to use the current measures described above, or (b) employ side setting with 60g swivels within 1m of the hook according to the specifications above, or (c) employ an underwater setting chute that has a minimum of 2.9m of its shaft underwater, when fishing north of 23 °N.

Alternative 5B: Use current mitigation measures or use side setting or use an underwater setting chute, in all areas.

Under this alternative, operators of Hawaii-based longline vessels could elect to either (a) continue to use the current measures described above, or (b) employ side setting with 60g swivels within 1m of the hook according to the specifications above, or (c) employ an underwater setting chute that has a minimum of 2.9m of its shaft underwater, in all areas.

Alternative 6A: Use current mitigation measures or use side setting or use an underwater setting chute or use a tori line (e.g., paired streamer lines), when fishing north of 23 °N.

Under this alternative, operators of Hawaii-based longline vessels could elect to either (a) continue to use the current measures described above, or (b) employ side setting with 60g swivels within 1m of the hook according to the specifications above, or (c) employ an underwater setting chute that has a minimum of 2.9m of its shaft underwater, or (d) employ one or more tori lines according to the general design used by McNamara et al. (1999) and Boggs (2001), when fishing north of 23 °N.

Alternative 6B: Use current mitigation measures or use side setting or use an underwater setting chute or use a tori line (e.g., paired streamer lines), in all areas.

Under this alternative, operators of Hawaii-based longline vessels could elect to either (a) continue to use the current measures described above, or (b) employ side setting with 60g swivels within 1m of the hook according to the specifications above, or (c) employ an underwater setting chute that has a minimum of 2.9m of its shaft underwater, or (d) employ one or more tori lines according to the general design used by McNamara et al. (1999) and Boggs (2001), in all areas.

<u>Alternative 7A:</u> Use current measures or use side setting or use a tori line (e.g., paired streamer lines), when fishing north of 23 °N.

Under this alternative, operators of Hawaii-based longline vessels could elect to (a) continue to use the current measures described above, or (b) employ side setting with 60g swivels within 1m of the hook according to the specifications above, or (c) employ one or more tori bird-scaring lines according to the general design used by McNamara et al. (1999) and Boggs (2001), when fishing north of 23 °N.

<u>Alternative 7B:</u> Use current measures or use side setting or use a tori line (e.g., paired streamer lines), in all areas.

Under this alternative, operators of Hawaii-based longline vessels could elect to (a) continue to use the current measures described above, or (b) employ side setting with 60g swivels within 1m of the hook according to the specifications above, or (c) employ one or more tori bird-scaring lines according to the general design used by McNamara et al. (1999) and Boggs (2001), in all areas.

<u>Alternative 7C:</u> Swordfish (shallow-setting) vessels use "current" mitigation measures except thawed blue-dyed bait, <u>or</u> use side setting, <u>or</u> use an underwater setting chute that has a minimum of 2.9m of its shaft underwater, <u>or</u> use a tori line (e.g., paired streamer lines), in all areas. Tuna (deep-setting) vessels use "current" mitigation measures except thawed blue-dyed bait, <u>or</u> use side setting in conjunction with a line shooter and weighted branch lines, <u>or</u> use an underwater setting chute that has a minimum of 2.9m of its shaft underwater, <u>or</u> use a tori line (e.g., paired streamer lines) in conjunction with a line shooter and weighted branch lines, when fishing north of 23 °N.

Under this alternative operators of Hawaii-based longline vessels targeting swordfish (shallow-setting) could elect to (a) use the measures currently required for vessels fishing north of 23 °N as described above except the requirement to use thawed blue-dyed bait, or (b) employ side setting with 60g swivels within 1m of the hook according to the specifications, below, or (c) use an underwater setting chute that has a minimum of 2.9m of its shaft underwater, or (d) employ one or more tori bird-scaring lines according to the general design used by McNamara et al. (1999) and Boggs (2001), in all areas.

Operators of Hawaii-based longline vessels targeting tuna (deep-setting) could elect to (a) use the measures currently required for vessels fishing north of 23 °N as described above except the requirement to use thawed blue-dyed bait, or (b) employ side setting with 60g swivels within 1m of the hook according to the specifications above in conjunction with a line shooter with weights of at least 45 g placed within one meter of each hook, or (c) use an underwater setting chute that has a minimum of 2.9m of its shaft underwater, or (d) employ one or more tori bird-scaring lines according to the general design used by McNamara et al. (1999) and Boggs (2001), when fishing north of 23 °N.

Alternative 7D:. *All deep setting Hawaii-based longline vessels must either side-set, or use a tori line plus the currently required measures (line shooter with weighted branch lines, blue dyed thawed bait and strategic offal discards) when fishing north of 23 ° - with the requirement to use strategic offal discards modified to require that vessel operators use them only when seabirds are present. All shallow setting Hawaii-based longline vessels must either side-set, or use a tori line plus the currently required measures (night-setting, blue dyed thawed bait and strategic offal discards) wherever they fish - with the requirement to use strategic offal discards modified to require that vessel operators use them only when seabirds are present.*

Under this alternative operators of Hawaii-based longline vessels targeting swordfish (shallow-setting) could elect to (a) use the modified current measures as described above with the addition of one or more tori bird-scaring lines according to the general design used by McNamara et al. (1999) and Boggs (2001), or (b) employ side setting with 60g swivels within 1m of the hook, in all areas.

Operators of Hawaii-based longline vessels targeting tuna (deep-setting) could elect to (a) use the modified current measures as described above with the addition of one or more tori bird-scaring lines according to the general design used by McNamara et al. (1999) and Boggs (2001), or (b) employ side setting with 60g swivels within 1m of the hook, when fishing north of 23 °N.

Alternative 8A: *Use current mitigation measures plus side setting, when fishing north of 23 °N.*

Under this alternative, operators of Hawaii-based longline vessels would be required to continue to use the current measures described above as well as to employ side setting with 60g swivels within 1m of the hook as described above, when fishing north of 23 °N.

Alternative 8B: *Use current mitigation measures plus side setting, in all areas.*

Under this alternative, operators of Hawaii-based longline vessels would be required to continue to use the current measures described above as well as to employ side setting with 60g swivels within 1m of the hook as described above, in all areas.

Alternative 9A: *Use side setting when fishing north of 23 °N.*

Under this alternative, operators of Hawaii-based longline vessels would be required to employ side setting with 60g swivels within 1m of the hook as described above, when fishing north of 23 °N.

Alternative 9B: *Use side setting in all areas.*

Under this alternative, operators of Hawaii-based longline vessels would be required to employ side setting with 60g swivels within 1m of the hook as described above, in all areas.

Alternative 10A: Use side setting unless technically infeasible[2], in which case use current mitigation measures, when fishing north of 23 °N.

Under this alternative, operators of Hawaii-based longline vessels would be required to employ side setting with 60g swivels within 1m of the hook as described above unless technically infeasible in which case they would be required to use the current measures described above, when fishing north of 23 °N.

Alternative 10B: Use side setting unless technically infeasible, in which case use current mitigation measures, in all areas.

Under this alternative, operators of Hawaii-based longline vessels would be required to employ side setting with 60g swivels within 1m of the hook as described above unless technically infeasible in which case they would be required to use the current measures described above, in all areas.

Alternative 11A: Use side setting unless technically infeasible, in which case either use current mitigation measures without blue bait or strategic offal discards (shallow-setting vessels set at night, deep-setting vessels use line shooters with weighted branch lines), or an underwater setting chute or a tori line, when fishing north of 23 °N.

Under this alternative operators of Hawaii-based longline vessels would be required to use side-setting with 60g swivels within 1m of the hook as described above unless technically infeasible, in which case shallow-setting vessels would be required to either (a) begin the setting process at least one hour after local sunset and complete the setting process by local sunrise, or (b) employ an underwater setting chute that has a minimum of 2.9m of its shaft underwater, or (c) employ one or more tori lines according to the general design used by McNamara et al. (1999) and Boggs (2001), when fishing north of 23 °N. Deep-setting vessels unable to side-set would be required to either (a) use the measures currently required for vessels fishing north of 23 °N, as described above, or (b) employ an underwater setting chute that has a minimum of 2.9m of its shaft underwater, or (c) employ one or more tori lines according to the general design used by McNamara et al. (1999) and Boggs (2001), when setting north of 23 °N.

Alternative 11B: Use side setting unless technically infeasible, in which case: swordfish (shallow-setting) vessels set at night, or use an underwater setting chute, or use a tori line (e.g., paired streamer lines), and tuna (deep-setting) vessels use current measures, or use an underwater setting chute, or use a tori line (e.g., paired streamer lines), when fishing north of 23 °N.

Under this alternative operators of Hawaii-based longline vessels would be required to use side-setting with 60g swivels within 1m of the hook as described above unless technically infeasible, in which case shallow-setting vessels would be required to either (a) begin the setting process at least one hour after local sunset and complete the setting process by local sunrise, or (b) employ

[2] The criteria for side setting infeasibility would be formulated by NMFS, in consultation with the Council and fishing industry during the rulemaking process.

an underwater setting chute that has a minimum of 2.9m of its shaft underwater, or (c) employ one or more tori lines according to the general design used by McNamara et al. (1999) and Boggs (2001), in all areas. Deep-setting vessels unable to side-set would be required to either (a) use the measures currently required for vessels fishing north of 23 °N, as described above, or (b) employ an underwater setting chute that has a minimum of 2.9m of its shaft underwater, or (c) employ one or more tori lines according to the general design used by McNamara et al. (1999) and Boggs (2001), in all areas.

Alternative 12: Voluntarily use side setting, an underwater setting chute, a tori line (e.g., paired streamer lines), night-setting, or a line shooter with weighted branch lines, when fishing south of 23 °N.

Under this alternative, operators of Hawaii-based longline vessels would be asked to voluntarily either (a) use side-setting with 60g swivels within 1m of the hook as described above, or (b) employ an underwater setting chute that has a minimum of 2.9m of its shaft underwater, or (c) employ one or more tori lines according to the general design used by McNamara et al. (1999) and Boggs (2001), or (d) begin the setting process at least one hour after local sunset and complete the setting process by local sunrise, or (e) use a line shooter with weights of at least 45 g placed within one meter of each hook, when fishing south of 23 °N.

A summary of these alternatives is provided in Table 5.

Table 5. Seabird mitigation measures included in each alternative. (Current requirements for annual protected species workshop attendance and seabird handling protocols would remain in place under all under all alternatives.)

Alt.	Description
1	**CURRENT MEASURES** **All Hawaii-based longline vessels** fishing north of 23° N. must: Discharge offal and spent bait on the opposite side from setting or hauling Use blue-dyed, thawed bait, and have a minimum of 2 cans of dye onboard **Vessels deep-setting** north of 23° N. must use a line setting machine (line shooter) and use minimum 45g weights within 1m of each hook, if using a monofilament main line[1] **Vessels shallow-setting** north of 23° N must begin setting at least 1 hour after local sunset and complete the setting process by local sunrise, using the minimum vessel lights necessary
2A	Use current mitigation measures **OR** use side setting, when fishing north of 23° N.
2B	Use above current mitigation measures **OR** use side setting, in all areas
3A	Use current mitigation measures **OR** use an underwater setting chute, when fishing north of 23° N.
3B	Use above current mitigation measures **OR** use an underwater setting chute, in all areas
4A	Use current mitigation measures **OR** use a tori line (e.g. paired streamer lines), when fishing north of 23° N.
4B	Use above current mitigation measures **OR** use a tori line (e.g. paired streamer lines), in all areas
5A	Use current mitigation measures **OR** use side setting **OR** use an underwater setting chute, when fishing north of 23° N.
5B	Use above current mitigation measures **OR** use side setting **OR** use an underwater setting chute, in all areas
6A	Use current mitigation measures **OR** use side setting **OR** use an underwater setting chute **OR** use a tori line (e.g. paired streamer lines), when fishing north of 23° N.

6B	Use above current mitigation measures **OR** use side setting **OR** use an underwater setting chute **OR** use a tori line (e.g. paired streamer lines), in all areas
7A	Use current mitigation measures **OR** use side setting **OR** use a tori line (e.g. paired streamer lines), when fishing north of 23° N.
7B	Use above current mitigation measures **OR** use a tori line (e.g. paired streamer lines), in all areas
7C	a. In all areas, shallow setting boats use current mitigation measures, excluding the requirement to use blue-dyed bait, OR use side setting **OR** use an underwater setting chute **OR** use a tori line (e.g. paired streamer lines). b. North of 23° N. deep setting boats use current mitigation measures, excluding the requirement to use blue-dyed bait, **OR** use side setting **OR** use an underwater setting chute **OR** use a tori line (e.g. paired streamer lines), in conjunction with a line shooter and weighted branch lines.
7D	a. All deep setting vessels must either side-set, or use a tori line plus the currently required measures (line shooter with weighted branch lines, blue dyed thawed bait and strategic offal discards) when fishing north of 23° - with the requirement to use strategic offal discards modified to require that vessel operators use them only when seabirds are present; b. All shallow setting vessels must either side-set, or use a tori line plus the currently required measures (night-setting, blue dyed thawed bait and strategic offal discards) wherever they fish - with the requirement to use strategic offal discards modified to require that vessel operators use them only when seabirds are present.
8A	Use current mitigation measures **PLUS** side setting, when fishing north of 23° N.
8B	Use above current mitigation measures **PLUS** side setting, in all areas
9A	Use side setting when fishing north of 23° N.
9B	Use side setting in all areas
10A	Use side setting **UNLESS** technically infeasible in which case use current mitigation measures, when fishing north of 23° N.
10B	Use side setting **UNLESS** technically infeasible in which case use above current mitigation measures, in all areas

11A	Use side setting **<u>UNLESS</u>** technically infeasible, in which case use an underwater setting chute **<u>OR</u>** a tori line **<u>OR</u>** current mitigation measures without blue bait or strategic offal discards (shallow-setting vessels set at night, deep-setting vessels use line shooters with weighted branch lines), when fishing north of 23° N.
11B	Use side setting **<u>UNLESS</u>** technically infeasible, in which case use an underwater setting chute **<u>OR</u>** a tori line **<u>OR</u>** above current mitigation measures without blue bait or strategic offal discards (shallow-setting vessels set at night, deep-setting vessels use line shooters with weighted branch lines), in all areas
12	Voluntarily use side setting, **<u>OR</u>** night-setting, **<u>OR</u>** an underwater setting chute, **<u>OR</u>** a tori line, **<u>OR</u>** a line shooter with weighted branch lines, when fishing south of 23° N.
1. Basket gear may also be used if deep set longline fishing above 23° N., with a requirement that the mainline be set slack to maximize the sinking of baited hooks	

8.4 Alternatives Considered but Eliminated from Detailed Analysis

As noted above, the primary objective of the proposed action is the cost-effective further reduction of the potentially harmful effects of fishing by Hawaii-based longline vessels on the short-tailed albatross, but the overarching goal is to reduce the potentially harmful effects of fishing by Hawaii-based longline vessels on all seabirds in a cost-effective manner. The strategy adopted to meet this action's objective is to reduce the rate of longline-seabird interactions. The alternative strategy, to reduce the consequences of interactions, is represented in current regulations by two measures, mandatory seabird handling techniques and annual attendance at a NMFS protected species workshop. These measures will remain in effect under all alternatives. They are not a part of the current action and will not be affected by it. No alternatives to eliminate or modify these measures were evaluated.

Some possible combinations of mitigation measures did not specifically appear in any of the alternatives due to impracticality or redundancy and these were, in effect, alternatives considered but not carried forward.

The alternatives that are analyzed here are intended to satisfy the objective of reducing the harmful effects of seabird interactions in the Hawaii-based longline fishery. Alternatives to impose measures on vessels registered to General Longline Permits were considered, but not carried forward. These vessels are prohibited from fishing in EEZ waters around Hawaii or landing any fish in Hawaii. They might tranship catches into Hawaii, but this has never happened in the history of the Hawaii fishery, due to the economics of running two vessels to land one vessel's catch (Sean Martin, personal communication).

Alternatives to impose measures on longline vessels based in California but not registered to Hawaii limited access permits were not considered as the Council does not have jurisdiction over these vessels which are prohibited from fishing in EEZ waters around Hawaii or landing any fish in Hawaii.

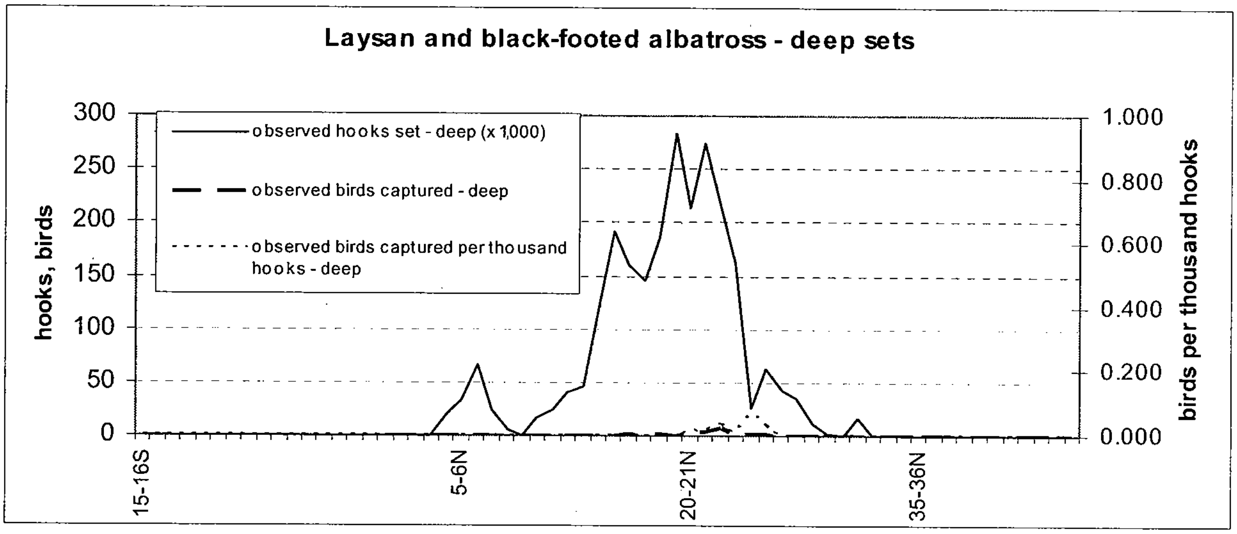
Other seabird interaction mitigation measures have been informally tested by fishermen (weighted hooks, towed trash bags, avoidance of setting in the vessel's wake, undyed thawed bait) and at least one, the bait-setting capsule, has been developed and tested as a prototype. Noise making, either with explosive devices or horns, has been shown to be ineffective. None of these measures, however, were considered by the Council in formulating its proposed action. None of these could be expected to have benefits of a different nature or greater magnitude than those evaluated here. Further, none of them have been tested in the Hawaii-based longline fishery, and their efficacies are unknown. Consequently, none of these measures were included in the alternatives evaluated here.

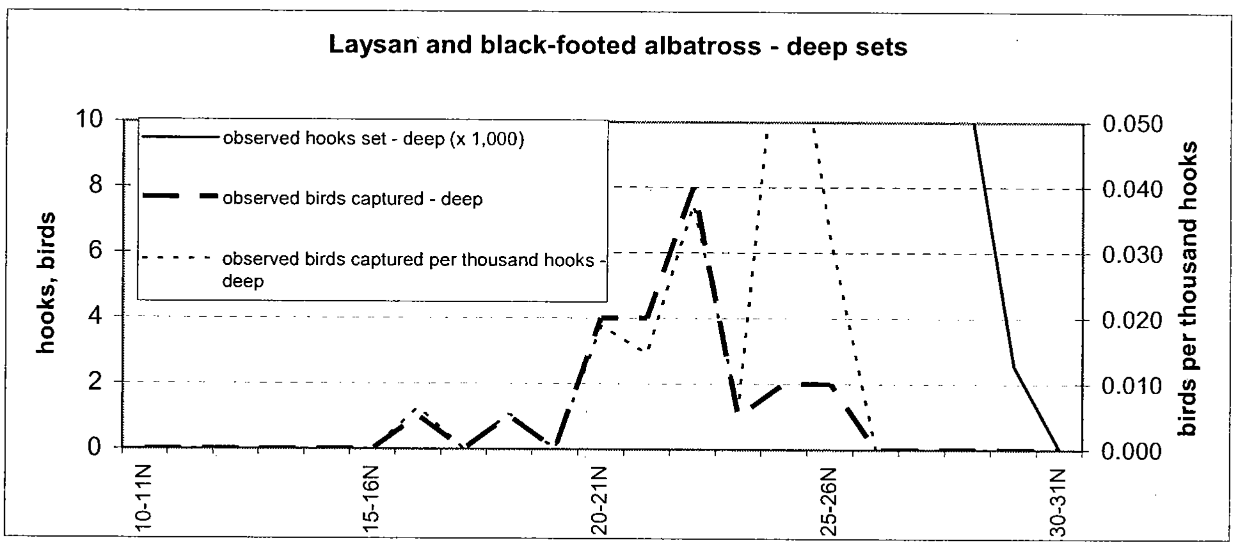
Other types of hooks and baits could eventually prove useful in mitigating seabird interactions. At this time, however, the specifications of hook and bait type in this fishery are rooted in experiments conducted in the Atlantic Ocean which dramatically reduced interactions with leatherback and loggerhead sea turtles. Any other combination of hook and bait would first have to be tested for efficacy in deterring interactions with sea turtles, and therefore, variations of hook or bait types were not included in the alternatives evaluated here.

Many of the alternatives considered here are paired, with one alternative employing seabird deterrents only at latitudes above 23° N. and the other employing deterrent measures wherever fishing is done. The current threshold for implementation of seabird deterrent measures in the Hawaii-based fleet is 23° N. The original rationale for that selection was to protect STAL and that is the lowest latitude at which a short-tailed albatross has ever been seen near Hawaii. The objective of this action however, is to cost-effectively reduce the harmful effects of all seabird captures by the fleet, so a reexamination of the rationale for this threshold is appropriate.

Black-footed and Laysan albatrosses forage across broad expanses of the Pacific ocean with black-footed albatrosses tending to move east to the coast of North America and Laysans tending to fly northward to the Gulf of Alaska. Foraging habitat includes the oceanic fronts and transition zone at latitudes north of Hawaii where elevated nutrient concentrations stimulate phytoplankton growth and indirectly all other trophic levels. Elevated squid concentrations attract seabirds, but they also attract swordfish, which in turn attract longline vessels and increase the likelihood of interactions between longlines and seabirds. Observer data were analyzed by 1degree increments to determine at which latitudes interactions were most prevalent (NMFS, PIRO unpub. data). Figures 3 and 4 graph combined Laysan and black-footed albatross captures observed in deep and shallow sets respectively before implementation of mandatory deterrent measures north of 23° N. The general conclusions are 1) there are no captures south of about 16° N despite a moderate amount of deep-set effort, 2) there are relatively few captures south of 23° N, 3) there is a rapid increase in captures at latitudes of 23° -26° N, 4) there is a relatively high rate of capture between about 27° and 30° N. (STFZ), 5) capture rates decrease in the range 31° - 41° °N. (Transition Zone [TZ]), and 6) very high capture rates are seen at still higher latitudes (SAFZ). "Observed captures" means birds recorded by NMFS vessel observers as hooked or entangled in the longline gear. These rates of observed fishing effort and interactions are not necessarily representative of actual rates of fishing effort or interactions but they represent the best available information.

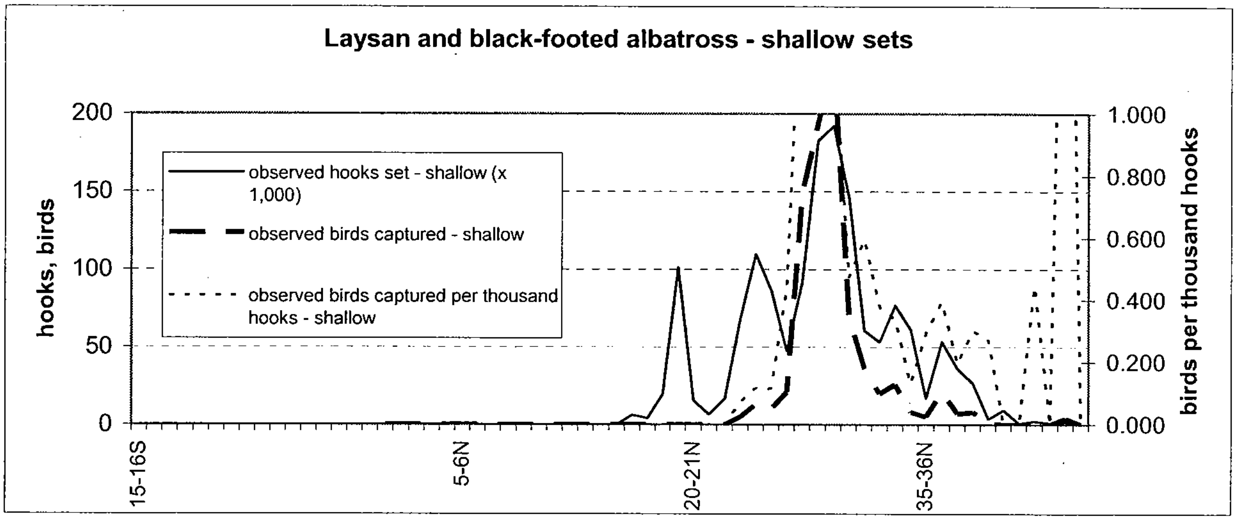
Figure 3 Observed Albatross Captures by Latitude in the Deep-set Sector of the Hawaii-based Longline Fishery (1994-1999) (Source: NMFS, Pacific Islands Regional Office, December 6, 2004)

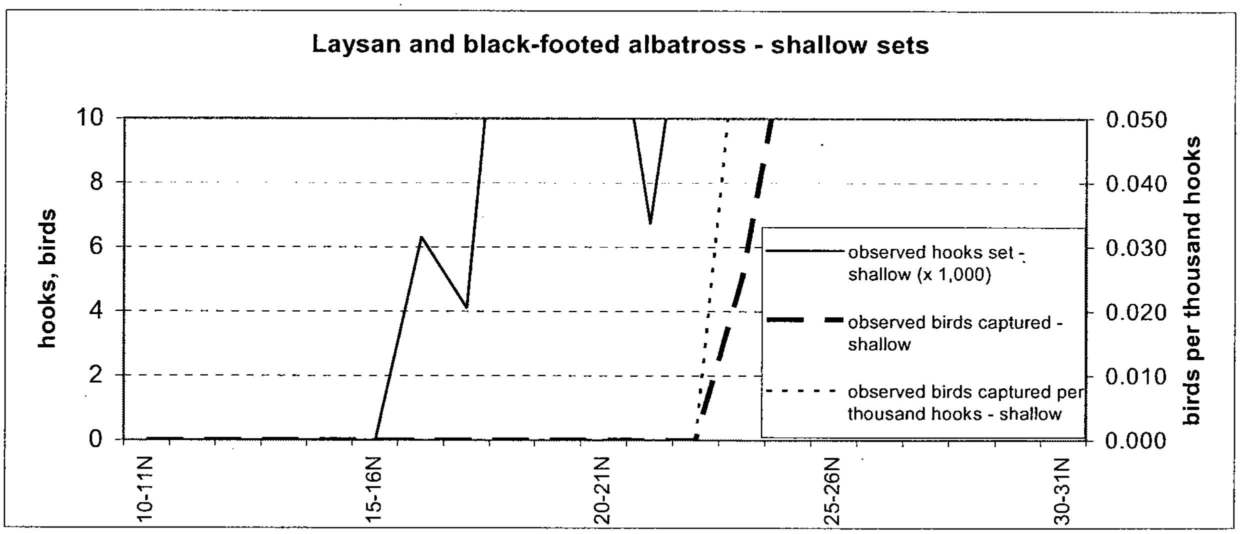




Set latitudes were put into 1 degree categories. For example, the 0-1 degree N. category included sets whose latitude was greater than or equal to 0 degrees and less than 1 degree N. ; the 0-1 degree S. category included sets whose latitude was greater than or equal to 0 degree and less than 1 degree S. (no sets on the equator were recorded). The latitude of a given set was taken as the vessel's latitude at the beginning of the deployment of the set. The lower graph is an expanded view of the portion of the upper graph where captures become more numerous. Note the different scales.

Figure 4 Observed Albatross Captures by Latitude in the Shallow-set Sector of the Hawaii-based Longline Fishery (1994-1999) (Source: NMFS, Pacific Islands Regional Office, December 6, 2004)





Set latitudes were again put into 1 degree categories. For example, the 0-1 degree N. category included sets whose latitude was greater than or equal to 0 degree and less than 1 degree N. ; the 0-1 degree S. category included sets whose latitude was greater than or equal to 0 degree and less than 1 degree S. (no sets on the equator were recorded). The latitude of a given set was taken as the vessel's latitude at the beginning of the deployment of the set. The lower graph is an expanded view of the portion of the upper graph where captures become more numerous. Note the different scales.

Another category of potential alternatives is time and/or area closures (obviously a time closure would apply to a certain area, or an area closure would apply for a specific time). The Hawaii-based longline fleet is currently subject to area closures around the NWHI and the MHI, the former especially significant in prohibiting longlining near seabird nesting areas. Time and area closures were considered in some detail but were not carried forward because the measures proved incompatible with the objective of the management measure to cost-effectively reduce the potential and real impacts of the fishery on seabirds. The paragraphs below summarize seasonable variability in seabird capture in the Hawaii-based longline fishery, and provide rationale for rejection of these types of operational controls on the fleet.

Seabird captures by the Hawaii-based longline fleet are characterized by strong seasonal variability. NMFS' annual report on seabird interactions in the longline fishery (NMFS 2004c) summarizes the 2003 takes by calendar quarter as shown in Table 6.

Table 6. Interactions with Black-footed and Laysan Albatross by Hawaii-based Longline Vessels by Calendar Quarter for 2003 (Source: NMFS 2004c)

Albatross Species	**Interactions per Quarter**				**Total Takes**
	Quarter 1	**Quarter 2**	**Quarter 3**	**Quarter 4**	
Black-footed	28	76	7	0	111
95% C.I.	6-58	36-114	1-27	0-12	NA
Laysan	28	118	0	0	146
95% C.I.	6-58	71-161	0-16	0-12	NA

Cousins and Cooper (2000) summarize the reproductive biology of the black-footed albatross as follows. Black-footed albatross lay their eggs in mid-November to early December. The mean incubation period is 65.6 days, during which time the adults forage close to the breeding colony. The chick hatches between mid-January and early February, and a brooding period lasting one to two weeks ensues. During this period, at least one parent stays with the chick. The adults forage close to the breeding colony during this period as well, but subsequently begin to take longer trips of two to three weeks. First quarter takes are markedly lower than second quarter takes and this may reflect the fact that adults are feeding very close to the colony during the first quarter, perhaps predominantly within the area around the NWHI closed to longline fishing. Feeding of the chick continues into June, and fledging takes place in late July after the parents cease feeding the chick. Adults spend the remainder of the year dispersed over the northern Pacific. Non-breeders and failed breeders leave the colony earlier, in April. The Laysan albatross breeding schedule is similar to that of the black-footed albatross. Given this seasonality of breeding colony occupation, it's clear why the observed albatross takes are so heavily concentrated in the first half of the year.

Consideration of time or area limitations on effort must be tempered by an appreciation that seasonality in swordfish effort that corresponds with the seasonality of seabird abundance in the NWHI. The Hawaii-based shallow-set effort is strongly seasonal, with the greatest effort concentrated in the first half of the year. This is brought about by annual cycles of oceanographic conditions. In the summer and fall, water temperatures favorable for fishing for swordfish are found far to the north. At those latitudes, trips are long, fuel costs are high, weather can be unpredictable and dangerous, and product quality can suffer. In the winter and spring, cooler water is closer to Hawaii and trips are shorter, safer and more economical. This is why Hawaii-based swordfish effort is concentrated during the first half of the year, and why effort limitations during that period could severely impact the economics of the fleet. Given the objective of this action (the cost-effective reduction of the effects of the Hawaii-based longline fishery on seabirds), the status of potentially affected seabird populations (apparently stable to increasing, see Section 10.5), and the availability of a broad range of alternative measures, time/area closures were not considered in detail.

None of the alternatives explicitly include additional information gathering or analysis of effectiveness. Any form of evaluation of mitigation measures on commercial fishing vessels will be dependent on the ability of observers to gather useful information on the performance of seabird avoidance measures, and the types of adjustments to the requirements that might then be pursued. As noted below, the records made by the current NMFS observer program do not always lend themselves to the collection of statistically reliable data. Collection of detailed information on the performance of various mitigation measures may require the deployment of observers solely dedicated to observing seabirds and their interactions with longlines.

9.0 National Environmental Policy Act

A Final Environmental Impact Statement is being prepared by NMFS for this action. A Draft Environmental Impact Statement was published on August 27, 2004.

10.0 Physical and Biological Environment

This section provides background information on the natural environment in which the Pelagics FMP fisheries operate.

10.1 Oceanographic Environment

The Hawaiian Archipelago and the Marianas Archipelago, which includes Guam and the Commonwealth of the Northern Mariana Islands (CNMI), lie in the North Pacific subtropical gyre, while American Samoa lies in the South Pacific subtropical gyre. These subtropical gyres rotate clockwise in the Northern Hemisphere and counter clockwise in the Southern Hemisphere in response to tradewind and westerly wind forcing. Hence the Main Hawaiian Islands (MHI), Guam and CNMI, and American Samoa experience weak mean currents flowing from east to west, while the northern portion of the Hawaiian Archipelago experiences a weak mean current flowing from west to east. Imbedded in this mean flow are an abundance of mesoscale eddies created from wind and current interactions with bathymetry. These eddies, which can rotate either clockwise or counter clockwise, have important biological impacts. Eddies create vertical fluxes, with regions of divergence (upwelling) where the thermocline shoals and deep nutrients are pumped into surface waters enhancing phytoplankton production, and also regions of convergence (downwelling) where the thermocline deepens. North and south of the islands are frontal zones that also provide an important habitat for pelagic fish and thus are targeted by fishers. To the north of the Hawaiian and Marianas Archipelagoes, and also to the south of American Samoa, lie the subtropical frontal zones consisting of several convergent fronts located along latitudes 25°-40° N. and S. often referred to as the Transition Zones. To the south of the Hawaiian and Marianas Archipelagoes, and to the north of American Samoa, spanning latitudes 15° N.-15° S. lies the equatorial current system consisting of alternating east and west zonal flows with adjacent fronts.

Significant sources of interannual physical and biological variation are the El Niño and La Niña events. During an El Niño, the normal easterly trade winds weaken, resulting in a weakening of the westward equatorial surface current and a deepening of the thermocline in the central and eastern equatorial Pacific. Water in the central and eastern equatorial Pacific becomes warmer and more vertically stratified with a substantial drop in surface chlorophyll. A La Niña event exhibits the opposite conditions. During an El Niño the purse seine fishery for skipjack tuna shifts over 1,000 km from the western to the central equatorial Pacific in response to physical and biological impacts (Lehodey et al., 1997).

Physical and biological oceanographic changes have also been observed on decadal time scales. These low frequency changes, termed regime shifts, can impact the entire ocean basin. Recent regime shifts in the North Pacific have occurred in 1976 and 1989, with both physical and biological (including fishery) impacts (Polovina, 1996; Polovina et al., 1995).

Pelagic species are closely associated with their physical and chemical environment. Suitable physical environment for these species depends on gradients in temperature, oxygen or salinity, all of which are influenced by oceanic conditions on various scales. In the pelagic environment, physical conditions such as isotherm and isohaline boundaries often determine whether or not the surrounding water mass is suitable for pelagic fish, and many of the species are associated with specific isothermic regions. Additionally, areas of high trophic transfer as found in fronts and eddies are an important habitat for foraging, migration, and reproduction for many species (Bakun, 1996).

Oceanic pelagic fish such as skipjack and yellowfin tuna, and blue marlin prefer warm surface layers, where the water is well mixed by surface winds and is relatively uniform in temperature and salinity. Other fish such as albacore, bigeye tuna, striped marlin and swordfish, prefer cooler, more temperate waters, often meaning higher latitudes or greater depths. Preferred water temperature often varies with the size and maturity of pelagic fish, and adults usually have a wider temperature tolerance than sub-adults. Thus, during spawning, adults of many pelagic species usually move to warmer waters, the preferred habitat of their larval and juvenile stages. Large-scale oceanographic events (such as El Niño) change the characteristics of water temperature and productivity across the Pacific, and these events have a significant effect on the habitat range and movements of pelagic species. Tunas are commonly most concentrated near islands and seamounts that create divergences and convergences which concentrate forage species, also near upwelling zones along ocean current boundaries, and along gradients in temperature, oxygen and salinity. Swordfish and numerous other pelagic species tend to concentrate along food-rich temperature fronts between cold, upwelled water and warmer oceanic water masses.

These fronts represent sharp boundaries in a variety of physical parameters including temperature, salinity, chlorophyll, and sea surface height (geostrophic flow) (Niiler and Reynolds, 1984; Roden, 1980; Seki et al., in press). Biologically, these convergent fronts appear to represent zones of enhanced trophic transfer (Bakun, 1996; Olsen et al., 1994). The dense cooler phytoplankton-rich water sinks below the warmer water creating a convergence of phytoplankton (Roden, 1980; Polovina et al., in review). Buoyant organisms, such as jellyfish as well as vertically swimming zooplankton, can maintain their vertical position in the weak down-welling, and aggregate in the front to graze on the down-welled phytoplankton (Bakun, 1996; Olsen et al., 1994). The increased level of biological productivity in these zones attracts higher trophic-level predators such as swordfish, tunas, seabirds, and sea turtles, and ultimately a complete pelagic food web is assembled.

Near Hawaii, there are two prominent frontal zones. These frontal zones are associated with two isotherms (17° C and 20° C), and they are climatologically located at latitudes 32°-34° N. (the Subtropical Front or STF) and latitudes 28°-30° N. (the South Subtropical Front or SSTF) (Seki et al., in press). Both the STF and SSTF represent important habitats for swordfish, tunas, seabirds and sea turtles. Variations in their position play a key role in catch rates of swordfish and albacore tuna, and distribution patterns of Pacific pomfret, flying squid, loggerhead turtles (Seki et al., in press), and seabirds. Hawaii-based longline vessels targeting swordfish set their lines where the fish are believed to be moving south through the fronts following squid, the primary prey of swordfish (Seki et al., in press). Squid is also the primary prey item for albatross (Harrison et al., 1983), hence the albatross and longline vessels targeting swordfish are often present at the same time in the same area of biological productivity.

These frontal zones have also been found to be likely migratory pathways across the Pacific for loggerhead turtles (Polovina et al., 2000). Loggerhead turtles are opportunistic omnivores that feed on floating prey such as the pelagic cnidarian *Velella velella* ("by the wind sailor"), and the pelagic gastropod Janthina sp., both of which are likely to be concentrated by the weak downwelling associated with frontal zones (Polovina et al., 2000). Data from on-board observers in the Hawaii-based longline fishery indicate that incidental catch of loggerheads occurs along the 17° C front (STF) during the first quarter of the year and along the 20° C front (SSTF) in the second quarter of the year. The interaction rate, however, is substantially greater along the 17° C front (Polovina et al., 2000).

Species of oceanic pelagic fish live in tropical and temperate waters throughout the world's oceans. They are capable of long migrations that reflect complex relationships to oceanic environmental conditions. These relationships are different for larval, juvenile and adult stages of life. The larvae and juveniles of most species are more abundant in tropical waters, whereas the adults are more widely distributed. Geographic distribution varies with seasonal changes in ocean temperature. In both the Northern and Southern Hemispheres, there is seasonal movement of tunas and related species toward the pole in the warmer seasons and a return toward the equator in the colder seasons. In the western Pacific, pelagic adult fish range from as far north as Japan to as far south as New Zealand. Albacore, striped marlin and swordfish can be found in even cooler waters at latitudes as far north as latitude 50° N. and as far south as latitude 50° S. As a result, fishing for these species is conducted year-round in tropical waters and seasonally in temperate waters.

Migration patterns of pelagic fish stocks in the Pacific Ocean are not easily understood or categorized, despite extensive tag-and-release projects for many of the species. This is particularly evident for the more tropical tuna species (e.g., yellowfin, skipjack, bigeye) which appear to roam extensively within a broad expanse of the Pacific centered on the equator. Although tagging and genetic studies have shown that some interchange does occur, it appears that short life spans and rapid growth rates restrict large-scale interchange and genetic mixing of eastern, central and far-western Pacific stocks of yellowfin and skipjack tuna. Morphometric studies of yellowfin tuna also support the hypothesis that populations from the eastern and western Pacific derive from relatively distinct sub-stocks in the Pacific. The stock structure of bigeye in the Pacific is poorly understood, but a single, Pacific-wide population is assumed. The movement of the cooler-water tuna (e.g., bluefin, albacore) is more predictable and defined, with tagging studies documenting regular and well-defined seasonal movement patterns relating to specific feeding and spawning grounds. The oceanic migrations of billfish are poorly understood, but the results of limited tagging work conclude that most billfish species are capable of transoceanic movement, and some seasonal regularity has been noted.

In the ocean, light and temperature diminish rapidly with increasing depth, especially in the region of the thermocline. Many pelagic fish make vertical migrations through the water column. They tend to inhabit surface waters at night and deeper waters during the day, but several species make extensive vertical migrations between surface and deeper waters throughout the day. Certain species, such as swordfish and bigeye tuna, are more vulnerable to fishing when they are concentrated near the surface at night. Bigeye tuna may visit the surface during the night, but generally, longline catches of this fish are highest when hooks are set in deeper, cooler waters just above the thermocline (275-550 meters or 150-300 fathoms). Surface concentrations of juvenile albacore are largely concentrated where the warm mixed layer of the ocean is shallow (above 90 m or 50 fm), but adults are caught mostly in deeper water (90-275 m or 50-150 fm). Swordfish are usually caught near the ocean surface, but are known to venture into deeper waters. Swordfish demonstrate an affinity for thermal oceanic frontal systems which may act to aggregate their prey (Seki et al., in press) and enhance migration by providing an energetic gain by moving the fish along with favorable currents (Olsen et al., 1994).

10.2 Pelagic Management Unit Species

The Pelagics FMP manages a suite of "pelagic management unit species" (PMUS, see Table 7). These species have been assigned to species assemblages based upon the ecological relationships between species and their preferred habitat. The species complex designations for the PMUS are marketable species, non-marketable species and sharks. The marketable species complex has been subdivided into tropical and temperate assemblages. The temperate species complex includes those PMUS that are found in greater abundance in higher latitudes as adults including swordfish, bigeye tuna, bluefin tuna, albacore tuna, striped marlin and pomfret. The tropical species complex includes all other tunas and billfish as well as *mahimahi*, wahoo and *opah*.

Species of oceanic pelagic fish live in tropical and temperate waters throughout the world's oceans, and they are capable of long migrations that reflect complex relationships to oceanic environmental conditions. These relationships are different for larval, juvenile and adult stages of life. The larvae and juveniles of most species are more abundant in tropical waters, whereas the adults are more widely distributed. Geographic distribution varies with seasonal changes in ocean temperature. Migration patterns of pelagic fish stocks in the Pacific Ocean are not easily understood or categorized, despite extensive tag-and-release projects for many of the species. This is particularly evident for the more tropical tuna species (e.g., yellowfin, skipjack, bigeye, which appear to roam extensively within a broad expanse of the Pacific centered on the equator. Likewise, the oceanic migrations of billfish are poorly understood, but the results of limited tagging work conclude that most billfish species are capable of transoceanic movement, and some seasonal regularity has been noted.

Movements of pelagic species are not restricted to the horizontal dimension. In the ocean, light and temperature diminish rapidly with increasing depth, especially in the region of the thermocline. Many pelagic fish make vertical migrations through the water column, often moving toward the surface at night to feed on prey species that exhibit similar diurnal vertical migrations. Certain species, such as swordfish, are more vulnerable to fishing when they are concentrated near the surface at night. Bigeye tuna may visit the surface during the night, but generally, longline catches of this fish are highest when hooks are set in deeper, cooler waters.

Adult swordfish are opportunistic feeders, preying on squid and various fish species. Oceanographic features such as frontal boundaries that tend to concentrate forage species (especially cephalopods) apparently have a significant influence on adult swordfish distributions in the North Pacific.

Table 7. Pelagic Management Unit Species

English or Common Name	Scientific Name
Mahimahi (dolphinfishes)	*Coryphaena* spp.
Wahoo	*Acanthocybium solandri*
Indo-Pacific blue marlin: Black marlin	*Makaira mazara: M. indica*
Striped marlin	*Tetrapturus audax*
Shortbill spearfish	*T. angustirostris*
Swordfish	*Xiphias gladius*
Sailfish	*Istiophorus platypterus*
Pelagic thresher shark	*Alopias pelagicus*
Bigeye thresher shark	*Alopias superciliosus*

Table 7. Pelagic Management Unit Species

English or Common Name	Scientific Name
Common thresher shark	*Alopias vulpinus*
Silky shark	*Charcharinus falciformis*
Oceanic whitetip shark	*Carcharhinus longimanus*
Blue shark	*Prionace glauca*
Shortfin mako shark	*Isurus oxyrinchus*
Longfin mako shark	*Isurus paucus*
Salmon shark	*Lamna ditropis*
Albacore	*Thunnus alalunga*
Bigeye tuna	*T. obesus*
Yellowfin tuna	*T. albacares*
Northern bluefin tuna	*T. thynnus*
Skipjack tuna	*Katsuwonus pelamis*
Kawakawa	*Euthynnus affinis*
Dogtooth tuna	*Gymnosarda unicolor*
Moonfish	*Lampris* spp
Oilfish family	*Gempylidae*
Pomfret	*family Bramidae*
Other tuna relatives	*Auxis* spp, *Scomber* spp; *Allothunus* spp

None of the PMUS stocks in the Pacific are known to be overfished, although concern has been expressed for several species and data are unavailable for others. Concise definitions of the various criteria used in the Pelagics FMP to analyze current levels of harvest exploitation and the status of PMUS stocks can be found in a publication by Boggs et al. (2000). That document and the 2001 NMFS Report to the U.S. Congress both contain estimates of the status of PMUS stocks. Those two publications and the most recent report of the Standing Committee on Tuna and Billfish (SCTB) are the main sources for the following sections regarding the current status of PMUS stocks.

Swordfish

There is considerable debate concerning the stock structure of swordfish in the Pacific. Several studies have been unable to reject the hypothesis that there is a single, Pacific-wide stock, while some recent evidence indicates that there may, in fact, be some delineation of separate stocks in different parts of the Pacific Ocean (Ward and Elscot, 2000). A stock assessment for North Pacific Swordfish by Kleiber & Yokawa (2002), using the Multifan-CL length-based, age structured, model suggests that the population in recent years is well above 50% of the unexploited biomass, implying that swordfish are not over-exploited and relatively stable at current levels of fishing effort.

Bigeye tuna

Genetic analyses indicate that there is a single pan-Pacific stock of bigeye (Grewe and Hampton, 1998). The most recent stock assessment of bigeye was presented at the SCTB 's 17[th] meeting held in August 2004 Hampton et al (2004). The assessment uses the stock assessment model and computer software known as MULTIFAN-CL ((Fournier, et al 1998).The bigeye tuna model is both age (40 age-classes) and spatially structured (5 regions) and the catch, effort, size composition and tagging data used in the model are classified by 17 fisheries and quarterly time periods from 1950 through 2007. The last 4–5 years (depending on the fishery) constitute a projection period in which the last year's fishing effort for each fishery is assumed to continue into the future. The data used in the assessment were the same as those used in 2003, with the exception that pre-1965 Japanese longline size composition data became available recently and were used in the assessment, and an additional year of fishery data (2002 for longline, 2002 for Philippines and Indonesia, 2003 for purse seine) was included. Recruitment showed an increasing trend from the 1970s on, while biomass declined through the 1960s and 1970s after which it was relatively stable or declining slightly. The fisheries are estimated to have reduced overall biomass to around 40% of unfished levels by 2003, with impacts more severe in the equatorial region of the WCPO, particularly in the west. Yield analyses suggest that recent average fishing mortality-at-age is approximately equivalent to the fishing mortality at Maximum Sustainable Yield (MSY), although the probability distribution of $F_{MSY}/F_{Current}$ is skewed such that the probability of the ratio being greater than 1.0 (i.e. overfishing is occurring) is 0.67–0.77, depending on assumptions regarding the stock-recruitment steepness coefficient. On the other hand, the current level of biomass is estimated to be high, around 1.7–2.3 times the equilibrium biomass expected at MSY. Current biomass has remained high because of above average recruitment since about 1990. The analysis in which catchability in the main longline fisheries was allowed to vary over time produced more pessimistic results than the constant catchability models – absolute levels of recruitment and biomass are lower (although the trends are similar), fishing mortality and fishery impact are higher, and recent average levels of fishing mortality are estimated to substantially exceed MSY levels ($F_{Current}/F_{MSY} = 1.7$). Current biomass is estimated to exceed the MSY level ($B_{Current}/B_{MSY} = 1.25$) but is at a lower level than estimated by the constant longline catchability models. On the basis of all of the results presented in the assessment, it was concluded that maintenance of current levels of fishing mortality carries a high risk of overfishing. Should recruitment fall to average levels, current catch levels would result in stock reductions to near and possibly below MSY-based reference points. Reduction of juvenile fishing mortality in the equatorial regions would have significant benefits for both the bigeye tuna stock and the longline fishery.

Albacore tuna

Albacore stocks appear to be in good condition and are experiencing moderate levels of exploitation. The most recent stock assessment of the southern albacore stock was presented at the SCTB 's 16[th] meeting held in June 2003 by Labelle & Hampton (2003), using the Multifan-CL stock assessment model. They concluded that current biomass is estimated to be about half of the maximum estimated levels and about 60% of the estimated equilibrium unexploited biomass. The impact of the fisheries on total biomass is estimated to have increased over time, but is likely to be low, a reduction of about 3% from unexploited conditions. The model results continue to indicate that recent catches are less than the Maximum Sustainable Yield (MSY), aggregate fishing mortality is less than F_{MSY} and the adult biomass is greater than B_{MSY}.

North Pacific albacore stocks are assessed at 1-2 year intervals by the North Pacific Albacore Workshop, comprising the USA, Japan, Canada and Taiwan. According to the latest assessment (NPALW, 2000), the albacore stock is healthy and not being overfished ($F/F_{msy} = 0.5\text{-}0.9$; $B/B_{msy} = 1.10 > MSST$), even though present catches are in the estimated MSY and Optimum Yield (OY) range. Stock and catches are both increasing due to the continuation of a high productivity oceanic regime. More recently the Fourth Meeting of the Interim Scientific Committee for Tuna and Tuna-Like Species in the North Pacific Ocean (ISC) reviewed the status of North Pacific albacore (ISC 2004). ISC reviewed the methods and results generated from length-based, age-structured stock assessments, including virtual population analysis (VPA) based on ADAPT models and preliminary, fully-integrated statistical models based on MULTIFAN-CL software. Results from the ADAPT models indicated that annual estimates of biomass over the last decade were relatively 'high' (i.e., compared with estimated biomass in the mid 1970s through the late 1980s); however, very recent population estimates suggest a 'leveling off' of the stock at large. Estimated recruitment is quite variable and suggests two oceanographic regimes: a low 'productivity' period from 1975 to 1989; and a higher 'productivity' period since that time. Based on recent and forecasted catch and recruitment levels, fishing mortality is relatively high (roughly, F 20%), either in excess of that required to produce MSY assuming a low productivity scenario or roughly at the MSY level assuming a high productivity scenario and proxy biological reference points for this species.

Yellowfin tuna

Some genetic analyses suggest that there may be several semi-independent yellowfin stocks in the Pacific including possible eastern and western stocks which may diverge around 150°W (Grewe and Hampton, 1998; Itano, 2000). On the other hand, tagging studies have shown individual animals are capable of large east-west movements that would suggest considerable pan-Pacific mixing of the stock. In fact, earlier mtDNA analysis failed to distinguish the presence of geographically distinct populations (Scoles and Graves, 1993; Ward *et al.*, 1994).

The most recent stock assessment of western Pacific yellowfin was presented by Hampton & Kleiber, 2003, at the SCTB's 17th meeting held in August 2004, employing the Multifan-CL model. The yellowfin tuna model was age (28 age-classes) and spatially structured (5 regions) and the catch, effort, size composition and tagging data used in the model were classified by 17 fisheries and quarterly time periods from 1950 through 2007. The last 4–5 years (depending on the fishery) constitute a projection period in which the last year's fishing effort for each fishery is assumed to continue into the future. Five independent analyses were conducted to test the impact of using different methods of standardising fishing effort in the main longline fisheries, using estimated or assumed values of natural mortality-at-age, and assuming fixed or variable catchability for the main longline fisheries.. The data used in the assessment were the same as those used in 2003 with the exception of an additional year of fishery data (2002 for longline, 2002 for Philippines and Indonesia, 2003 for purse seine) was included. For both sets of analyses, the current results are more pessimistic than last year's results with lower overall recruitment, lower equilibrium yields, higher current exploitation rates, and higher impacts due to fishing. It is also important to note that the key reference points are sensitive to our initial assumptions regarding the nature of the stock-recruitment relationship. The assumed prior distribution for the steepness parameter for the stock and recruitment relationship is highly influential. Moreover, a relaxation of this assumption results in a more pessimistic assessment despite the lack of any evidence of a strong relationship between spawning stock biomass and recruitment. For future assessments, a comprehensive review of appropriate values of stock-recruiment steepness for yellowfin is required to determine appropriate values for inclusion in a range of sensitivity analyses. The main reference points from the stock assessment indicate that the long-term average biomass should remain above that capable of producing MSY, and that there is limited potential to expand long-term yields from the fishery at the current pattern of age-specific selectivity. The authors note, however, that this apparently healthy situation arises mainly from low levels of exploitation in sub-equatorial regions of the Western and Central Pacific Ocean. Reduction of juvenile fishing mortality in the western equatorial region principally the Indonesian fishery, would have significant benefits for both the yellowfin tuna stock and the longline fishery.

Bluefin tuna

Bluefin tuna are slower to become sexually mature than other species of tuna and this makes them more vulnerable to overfishing. Variability in catch per unit of effort (CPUE) in the eastern Pacific seems to be due to variability in the number of fish migrating from the western Pacific to the coast of North America. This variability may be driven by changes in the forage base available in the western Pacific. Conceivably, these variations in trans-Pacific movements could affect the catch rates of Hawaii-based vessels.

The Inter-American Tropical Tuna Commission reviews the status of bluefin tuna occasionally (IATTC 2001). Catches have decreased since the late 1950s, but now appear to be in recovery. Evidence for overfishing or for persisting decline in the stock, which is mainly in the western Pacific, is lacking. An MSY has not been determined, but a proxy value has been established by the Pacific Regional Fishery Management Council (PRFMC, 2003) of 20,000 metric tonnes (44 million pounds), with OY 75% of that MSY.

More recently the Fourth Meeting of the Interim Scientific Committee for Tuna and Tuna-Like Species in the North Pacific Ocean (ISC) presented the result of a MULTIFAN-CL stock assessment of Pacific bluefin (PBF) conducted on data from 1952 t0 2002 (ISC 2004).The PBF fishery has been sustained for over 50 years while taking annual catches similar to those taken in recent years PBF biomass and spawning stock biomass (S)have fluctuated widely over the fifty-year history examined in the stock assessment . These fluctuations have been driven mainly by recruitment changes (without trend) over this period. Biomass appears to have recovered from a record low level in the late 1980's to a more intermediate level in recent years, largely due to better than average recruitment during the 1990's (particularly the strong 1994 year-class). Despite good recruitment, however, the S has generally declined since 1995 and if the estimated recent fishing mortality rates (F) continue, S would likely continue to decline at least over the 2003-2005 period. Recent F is greater than Fmax, which has economic implications (too much fishing effort for the yield returned) and is also generally taken as an indicator of biological concern. In particular, the high F on young fish (ages 0-2) and older fish (ages 6+) may be cause for concern with respect to maintaining a sustainable fishery in future years. ISC recommended that there be no further increases in F for any of the fisheries taking PBF. Further, ISC also recommended that every effort should be made to reduce the uncertainty associated with the assessment results by undertaking improvements in the data collection, data analyses, and assessment models used in the PBF stock assessment process.

Skipjack tuna
It is believed that the skipjack tuna in the Pacific belong to a single population (Shomura *et al.*, 1994). All recent analyses indicate that harvest ratios are appropriate for maintaining current catch levels and that overall the stocks are very healthy (Boggs *et al.*, 2000). Although local depletions and variability may occur in response to local environmental conditions and fishing practices, the overall stock is healthy and can support existing levels of fishing (PFRP, 1999; SCTB, 2003).

The most recent stock assessment for western Pacific stocks was also presented at the SCTB's 16th meeting (Langley et al, 2003) using the Mutlifan-CL method. The results showed that biomass trends are driven largely by recruitment, with the highest biomass estimates for the model period being those in 1998-2001. The model results suggest that the skipjack population in the WCPO in recent years has been at an all-time high. The impact of fishing is predicted to have reduced biomass by 20-25%. An equilibrium yield analysis confirms that skipjack is currently exploited at modest level relative to its biological potential. The estimates of F/Fmsy and B/Bmsy suggest that the stock is neither being overfished nor in an overfished state. Recruitment variability, and influences by environmental conditions will continue to be the primary influence on stock size and fishery performance.

Kawakawa tuna, black marlin, shortbilled spearfish, sailfish
The stock status of small tunas such as the kawakawa (*Euthynnus affinis*) and various billfish are unknown. Catches of these species comprise a minor fraction of pelagic fisheries in the Western Pacific.

Blue marlin
Based on the assumption that there is a single, Pacific-wide stock, various recent analyses characterize the blue marlin population as stable and close to that required to support average maximum sustainable yield (AMSY) (Boggs *et al,* 2000; IATTC, 1999; PFRP, 1999; Hinton and Nakano, 1996). Kleiber et al (2003) conducted a Multifan-CL stock assessment of Pacific blue marlin. They found that there was considerable uncertainty in quantifying the fishing effort levels that would produce a maximum sustainable yield. It was concluded that, at worst, blue marlin in the Pacific are close to a fully exploited state, that is the population and the fishery are somewhere near the top of the yield curve. It appears that the stock has been in this condition for the past 30 years, while the level of longline fishing effort has increased in the Pacific.

Striped marlin
Little is known about the overall status of the putative northern stock that supports the fishery in the management area although longline CPUE has demonstrated a declining trend in recent years (WPRFMC, 1999d). Hinton & Bayliff (2002) presented an assessment of Eastern Pacific Ocean

(EPO) striped marlin. The trends for the catch rates of the northeastern and northwestern areas of the central-eastern Pacific are not significantly different. The same is the case for catch rates in the EPO north and south of 10N. These results suggest that the fish in the EPO belong to one stock. Reexamination of published genetic data by Hinton & Bayliff (2002) suggests that there is a stock located in the southwestern Pacific (Australia) , but provided no clear resolution of separate stocks for the Ecuador-Hawaii-Mexico triad of sampling locations.

The current biomass of striped marlin in the EPO is apparently equal to that which would produce the average maximum sustainable yield of about 4,500 mt. Retained catch and standardized fishing effort for striped marlin decreased in the EPO from 1990-1991 through 1998, and preliminary estimates indicate that nominal fishing effort in the area has continued to decrease during the 1999-2001 period. This may result in a continued decrease in standardized fishing effort for striped marlin, with an associated continuing increase in their biomass in the EPO.

Blue shark

Nakano and Watanabe (1992) attempted a stock assessment for blue sharks based on catch data from the high seas driftnet fishery (which ceased in 1992) with supplemental data from longliners. Although there was some concern about whether Nakano and Watanabe had sufficient information to make an adequate estimate of stock size (Wetherall and Seki, 1991), they estimated minimum stock size in the North Pacific at 52-67 million individuals and argued that "even the minimum stock can sustain the present catch level although the mortality rate at [the] early stage is not known for blue shark."

More recently, Matsunaga and Nakano (1999) analyzed catch data from Japanese longline research and training vessels. Two data sets were available, one from 1967-1970 and one from 1992-1995, and were geographically stratified. They found blue sharks to comprise between 73% and 85% of total catch in the 10°-20°N strata and 31-57% in the 0°-10°N strata during the two time periods. Matsunaga and Nakano found that blue shark CPUE increased slightly from the 1967-1970 to the 1992-1995 period in these two strata, but the difference was not statistically significant.

The most current stock assessment of blue shark in the Pacific was conducted by Kleiber et al (2001) using the Multifan-CL model. All scenarios generated by the model show a significant decline in the blue shark population during the 1980s followed by various degrees of recovery during the 1990s. The decline in the 1980s coincided with the existence of an extensive small-mesh driftnet fishery in the North Pacific and recovery of the stock occurs following the banning of the driftnet fishery. On the basis of the most pessimistic estimate of stock size, maximum sustainable yield (MSY) is estimated to be approximately twice the current take (average of annual takes from 1994 through 1998) by all fisheries in the North Pacific. In this scenario, the fishing mortality at MSY (F_{msy}) is approximately twice the current level of fishing mortality (average of fishing mortality from 1994 through 1998) by all fisheries in the North Pacific. Other, equally plausible estimates indicate that the stock could support an MSY up to four times current take levels and F_{msy} up to 15 times current fishing mortality.

Thresher sharks
In California, 94 percent of the total thresher shark commercial landings are taken in the driftnet ("drift gillnet") fishery for swordfish, where it is the second most valuable species landed. Catches peaked early in this fishery with approximately 1,000 mt taken in 1982 , but declined sharply in 1986 (Hanan *et al.*, 1993). Since 1990, annual catches have averaged 200 mt (1990-1998 period) and appear stable (Holts, 1998). Catch per unit effort (CPUE) has also declined from initial levels.

Declines in CPUE indicate a reduction in the thresher shark population (Holts, 1998). The decline in the driftnet CPUE as a measure of the magnitude of the decline of the stock is confounded by the effects of the various area and time closures, the offshore expansion of the fishery, and the changed emphasis from shark to swordfish among most of the fishers. Based on the estimated rate of population increase, the common thresher MSY is estimated to be as little as four to seven percent of the standing population that existed at the beginning of the fishery.

Mako sharks
This species is also taken primarily by the California driftnet fishery for swordfish. Although current catches are only about 80 mt/yr in the California fishery, the mako shark is still the second most valuable species taken in the fishery. Like the common thresher, shortfin mako catches have been affected by the changes that occurred in the driftnet fishery. Catches peaked soon after the fishery started (240 mt in 1982) and then declined. Makos are also taken in smaller amounts (<10 mt/yr) by California-based longliners operating beyond the EEZ (Vojkovich and Barsky, 1998). This fishery takes primarily juveniles and subadults, probably because the area serves as a nursery and feeding area for immature stages (Hanan *et al.*, 1993). The mako shark distribution is affected by temperature, with warmer years being associated with more northward movement. According to PRFMC (2003), clear effects of exploitation of the shrortfin mako shark have not been shown for West Coast populations, and local stocks are thought not to be overfished.

Ocean whitetip shark
The oceanic whitetip shark is one of the three most abundant sharks (Compagno, 1984). Bonfil (1994) estimated 8,200 tons of oceanic whitetips were caught from the WPCO in 1989. Stevens (1996) "roughly estimated" 50,000 to 239,000 tons of oceanic whitetips were caught by the international Pacific high-seas fisheries (purse seine, longline, and drift-net) in 1994. Although silky sharks represent more of the fisheries catch, oceanic whitetips are believed to be more abundant (Straurg, 1958). There have been no quantitative assessments of Pacific oceanic whitetip shark populations published to date.

Silky shark
The silky shark is one of the three most abundant pelagic sharks, along with the blue and oceanic whitetip sharks (Compagno, 1984). Bonfil (1994) estimated 19,900 tons of silky sharks were caught from the South Pacific Commission (SPC) zone in the central and south Pacific in 1989. Stevens (1996) estimated 84,000 tons of silky sharks were caught in the international Pacific high-seas fisheries (purse seine, longline, and drift-net). Oshiya (2000) has conducted a stock

assessment of Pacific silky sharks, with an estimated Pacific-wide standing stock of 170,000 to 240,000 tonnes, from which 15,000 and 20,000 tonnes is caught annually by longline vessels.

Mahimahi and Wahoo

Stock characteristics for *C. hippurus* are not known. A preliminary analysis of mahimahi in the central and western Pacific was presented at the 16th SCTB in June 2003 (Dalzell and Williams unpublished). Annual mahimahi catches in the Pacific Islands were generally small, of the order of a few hundred tonnes, but Taiwan, with its large longline fleet landed on average almost 7,000 tonnes per year. Plots of mahimahi and wahoo across the C-W Pacific showed that catch rates of mahimahi of these species were highest in sub-tropical latitudes. Catch rates were also strongly seasonal, with on average a three-fold difference between low and high season CPUEs. Longline catch rates of mahimahi and wahoo showed strong stratification by depth (as expressed by distance of the hook from the float line), with mahimahi CPUE highest on the shallowest hook, and wahoo CPUE highest on the third hook from the float line.

Catches of both species have been variable in both longline and troll fisheries in the U.S. Pacific Islands, but have increased markedly in American Samoa due to the rapid expansion of the longline fishery after 2000. Troll and longline catches have increased over the past 20 years in Hawaii. Catch rates have also been variable , but both troll and longline catch per unit effort (CPUE) data shows reasonably similar trend in Hawaii and American Samoa. Similar CPUE trends for mahimahi and wahoo were noted for troll fisheries in Guam and the Northern Mariana Islands. The average size of wahoo in troll and longline catches in Hawaii had remained relatively stable over the past two decades, as did the troll caught mean size of mahimahi. Hawaii longline caught mahimahi showed a major decline in mean size between the 1980s and 1990s. The average size of mahimahi and wahoo were larger in longline compared to troll catches. Troll caught wahoo declined in size in American Samoa. The average sizes of mahimahi in Guam and the CNMI were similar, but wahoo were slightly larger in the CNMI troll fishery.

A summary of the various PMUS and their status relative to the control rule reference points adopted by the Council is given in Table 8.

Table 8. Estimates of stock status in relation to reference points for PMUS.

Stock	Overfishing reference point	Is overfishing occurring?	Overfished reference point	Is the stock overfished?	Assessment results	Natural mortality[1]	MSST
Skipjack Tuna (WCPO)	F_{2002}/F_{MSY}=0.12	No	B_{2002}/B_{MSY}=3.1	No	Langley et al. 2003	>0.5 yr^{-1}	0.5 B_{MSY}
Yellowfin Tuna (WCPO)[2]	F_{2002}/F_{MSY}=0.63	No, probability that F_{2002}/F_{MSY} is >1 is ~15%	B_{2002}/B_{MSY}=2.46	No	Hampton et al. 2004a	0.8-1.6 yr^{-1}	0.5 B_{MSY}
Albacore Tuna (S. Pacific)	F_{2002}/F_{MSY}=0.05	No	B_{2002}/B_{MSY}=1.3	No	Labelle & Hampton 2003	0.3 yr^{-1}	0.7 B_{MSY}
Albacore Tuna (N. Pacific)	Unknown		Unknown			0.3 yr^{-1}	0.7 B_{MSY}
Bigeye Tuna (WCPO)[2]	F_{2002}/F_{MSY}=0.98	Yes, probability that F_{2002}/F_{MSY} is >1 is at least 67%	B_{2002}/B_{MSY}=1.75	No	Hampton et al. 2004b	0.4 yr^{-1}	0.6 B_{MSY}
Blue Marlin (Pacific)	F_{1997}/F_{MSY}=0.50	No	B_{1997}/B_{MSY}=1.4	No	Kleiber et al. 2002	0.2 yr^{-1}	0.8 B_{MSY}
Swordfish (N. Pacific)[3]	F_{2002}/F_{MSY}=0.33	No	B_{2002}/B_{MSY}=1.75	No	Kleiber & Yokawa 2004	0.3 yr^{-1}	0.7 B_{MSY}
Blue Shark (N. Pacific)	F_{1999}/F_{MSY}=0.01	No	B_{1999}/B_{MSY}=1.9	No	Kleiber et al. 2001	Unknown	
Other Billfishes	Unknown		Unknown			Unknown	
Other Pelagic Sharks	Unknown		Unknown			Unknown	
Other PMUS	Unknown		Unknown			Unknown	

[1] Estimates based on Boggs et. al 2000

[2] Assessment results based on statistical habitat-based standardized (SHBS) effort time-series and a SRR steepness assumption of 0.75

[3] Assssment results based on natural mortality fixed at 0.2 yr^{-1}

10.3 Sea Turtles

All sea turtles are designated under the ESA as either threatened or endangered. The breeding populations of the Mexico olive ridley turtles (*Lepidochelys olivacea*) are currently listed as endangered. Also listed as endangered are the leatherback turtles (*Dermochelys coriacea*) and hawksbill turtles (*Eretmochelys imbricata*). Green sea turtles (*Chelonia mydas*) and loggerhead turtles (*Caretta caretta*) are listed as threatened, but are afforded the same protection as endangered sea turtles. These five species of sea turtle are highly migratory, or have a highly migratory phase in their life history, and therefore, are susceptible to being incidentally caught by longline fisheries operating in the Pacific Ocean.

The populations of several species of sea turtles have declined in the Pacific as the result of nesting habitat loss and excessive and widespread harvesting for commercial and subsistence purposes (Eckert 1993). Leatherback and loggerhead turtles are the species of principal concern with regard to incidental take in Pacific pelagic longline fisheries. These fisheries are conducted mainly by Japan, Taiwan, Korea and the U.S. There are only two populations of loggerhead turtles in the Pacific, one originating in Australia where serious declines are occurring, and the other in southern Japan (Eckert 1993). Leatherback turtles inhabiting the Pacific mainly originate from nesting beaches in Mexico and Costa Rica where significant declines have been documented; from Indonesia where their status is uncertain but possibly stable; and from Malaysia where the nesting colony is nearly extinct despite 30 years of conservation measures (Eckert 1993).

The diet of the leatherback turtle generally consists of cnidarians (i.e., medusae and siphonophores) in the pelagic environment. Leatherback turtles have the most extensive range of any living reptile and have been reported circumglobally from latitudes 71° N. to 42° S. in the Pacific and in all other major oceans. In a single year a leatherback may swim more than 10,000 km. They lead a completely pelagic existence, foraging widely in temperate waters except during the nesting season, when gravid females return to beaches to lay eggs. Typically leatherback turtles are found in convergence zones and upwelling areas in the open ocean, along continental margins, and in archipelagic waters. Hawaii fishers in offshore waters commonly see leatherback turtles, generally beyond the 100 fm curve but within sight of land. Two areas where sightings often take place are off the north coast of Oahu and the west coast of the Island of Hawaii. The pelagic zone surrounding the Hawaiian Islands is apparently regularly used as foraging habitat and migratory pathways for this species. Further to the north of the Hawaiian islands, a high seas aggregation of leatherback turtles is known to occur at 35° N. latitude, between 175° W. and 180° longitudes (NMFS, 1991).

The loggerhead turtle is listed as a threatened species throughout its range, primarily due to incidental mortality associated with commercial fishing operations and the alteration and destruction of its habitat. It is a cosmopolitan species found in temperate and subtropical waters and inhabiting continental shelves, bays, estuaries and lagoons. Major nesting grounds are generally located in warm temperate and subtropical regions, generally north of 25° N. or south of 25° S. latitude in the Pacific Ocean. For their first several years of life, loggerheads forage in open ocean pelagic habitats. Both juvenile and subadult loggerheads feed on pelagic crustaceans, mollusks, fish, and algae. As they age, loggerheads begin to move into shallower waters, where, as adults, they forage over a variety of benthic hard- and soft-bottom habitats (reviewed in Dodd, 1988). Satellite telemetry studies show that loggerhead turtles tend to follow 17° and 20° C sea surface isotherms north of the Hawaiian islands.

The olive ridley turtle is listed as threatened in the Pacific, except for the Mexican nesting population, which is listed as endangered, primarily because of over-harvesting of females and eggs. The olive ridley is one of the smallest living sea turtles (carapace length usually between 60 and 70 cm) and is regarded as the most abundant sea turtle in the world. Since the directed take of sea turtles was stopped in the early 1990s, the nesting populations in Mexico appear to be recovering, with females nesting in record numbers in recent years. In 1996, the primary nesting beach at La Escobilla in Oaxaca sustained over 800,000 nests. There is some discussion in Mexico that the species should be considered recovered. The olive ridley turtle is omnivorous and identified prey include a variety of benthic and pelagic items such as shrimp, jellyfish, crabs, snails, and fish, as well as algae and sea grass (Marquez, 1990).

Green turtles in Hawaii are genetically distinct and geographically isolated which is uncharacteristic of other regional sea turtle populations. Both the nesting population and foraging populations of green turtles in Hawaii appear to have increased over the last 30 years. Balazs and Chaloupka (2004) document a substantial long-term increase in abundance of the once seriously depleted green sea turtle stock in Hawaii. This population increase has occurred in a far shorter period of time than previously thought possible.

The hawksbill turtle is listed as endangered throughout its range. In the Pacific, this species is apparently declining due to the harvesting of the species for its meat, eggs and shell, as well as the destruction of nesting habitat by human occupation and disruption. There are no reports of interactions between this species and the Hawaii-based longline fishery, although the potential for interaction exists. Hawksbill turtles have a relatively unique diet of sponges.

The NMFS 2004 BiOp on the effects of the Hawaii pelagic longline fishery on sea turtle populations (NMFS 2004) concluded that the continuing operation of the fishery was not likely to jeopardize the continual existence and recovery of any sea turtle species. The use of side setting is a method of deploying baited hooks into the sea. The mitigation properties of large circle hooks and mackerel bait, that have been found to be effective at minimizing sea turtle interactions will not be affected by this deployment method, so this methodology should not have an adverse impact on listed sea turtle populations in the Pacific Ocean. However, NMFS is required to continue monitoring the incidental takes and mortality of sea turtles and seek ways to reduce them. Data for monitoring take levels and factors that affect takes are collected through a NMFS observer program operated by the Pacific Islands Regional Office and mandatory longline logbooks submitted to NMFS by longline vessel captains.

10.4 Marine Mammals

With the exception of the Hawaii-based longline fishery (Category I) all fisheries in the western Pacific region are classified as Category III under section 118 of the Marine Mammal Protection

Act of 1972 (62 FR 28657, May 27, 1997). As a Category I fishery, operators of vessels registered to Hawaii longline permits must submit federal logbooks and reports of injuries to marine mammals to NMFS, and carry observers if requested by NMFS.

Cetaceans that are listed under the Endangered Species Act (ESA) that have been observed in the region where Hawaii-based longline vessels operate include the humpback whale (*Megaptera novaeangliae*), sperm whale (*Physeter macrocephalus*), blue whale (*Balaenoptera musculus*), fin whale (*B. physalus*), sei whale (*B. Borealis*), and the North Pacific right whale (*Eubalaena japonica*). Other cetaceans not listed under the Endangered Species Act, but protected under the Marine Mammal Protection Act are also occasionally encountered in the longline fishery. These species mainly consist of dolphins and the smaller beaked and toothed whales (NMFS Observer Program, unpub. data). Interactions between any species of cetaceans and the Hawaii longline fishery are unusual. Between 1994 and 1999, NMFS observers recorded two entanglements involving a humpback whale and sperm whale (Hill *et al.*, 1997; Nitta and Henderson, 1993; Dollar, 1991). False killer whales occasionally strip the bait from longline hooks (NMFS Observer Program, unpub. data). To avoid this type of interaction Hawaii-based longline vessels that encounter false killer whales delay setting their lines until a sufficient distance between the vessel and the whale school has been achieved (NMFS Observer Program, unpub. data.

Hawaiian monk seals comprise one of the two remaining species of the genus *Monachus*, one of the most primitive genera of seals. The species was listed as endangered under the ESA in 1976, and it is one of the most endangered marine mammal species in the United States. The Hawaiian monk seal is endemic to the Hawaiian Archipelago and Johnston Atoll, and is the only endangered marine mammal that exists wholly within the jurisdiction of the United States.

Hawaiian monk seals are brown or silver in color, depending upon age and molt status, and can weight up to 270 kg. Adult females are slightly larger than adult males. It is thought that monk seals can live to 30 years. Monk seals stay on land for about two weeks during their annual molts. Monk seals are nonmigratory, but recent studies show that their home ranges may be extensive (Abernathy and Siniff 1998). Counts of individuals on shore compared with enumerated sub-populations at some of the NWHI indicate that monk seals spend about one-third of their time on land and about two thirds in the water (Forney et al. 2000).

The six major reproductive sites are French Frigate Shoals, Laysan Island, Lisianski Island, Pearl and Hermes Reef, Midway Atoll and Kure Atoll. Small populations at Necker Island and Nihoa Island are maintained by immigration, and a few but growing number of seals are found throughout the MHI, where preliminary surveys have counted more than 50 individuals. NMFS researchers have also observed monk seals at Gardner Pinnacles and Maro Reef. Additional sightings and at least one birth have occurred at Johnston Atoll, excluding eleven adult males that were translocated to Johnston Atoll (nine from Laysan Island and two from French Frigate Shoals) over the past 30 years.

In 2001, the minimum population estimate for monk seals was 1,378 individuals (based on enumeration of individuals of all age classes at each of the subpopulations in the NWHI, derived estimates based on beach counts for Nihoa and Necker, and aerial survey estimates for the MHI) (Carretta et al. 2003). The best estimate of the total population size was 1,409.

Population trends for monk seals are determined by the highly variable dynamics of the six main reproductive sub-populations. The sub-population of monk seals on French Frigate Shoals has shown the most change in population size, increasing dramatically in the 1960s-1970s and declining in the late 1980s-1990s. In the 1960s-1970s, the other five sub-populations experienced declines. However, during the last decade the number of monk seals increased at Kure Atoll, Midway Atoll and Pearl and Hermes Reef while the sub-populations at Laysan Island and Lisianski Island remained relatively stable. At the species level, however, demographic trends over the past decade have been driven primarily by the dynamics of the French Frigate Shoals subpopulation, where the largest monk seal population is experiencing an increasingly unstable age distribution resulting in an inverted age structure. This age structure indicates that recruitment of females and pup production may soon decrease. In the near future, total population trends for the species will likely depend on the balance between continued losses at French Frigate Shoals and gains at other breeding locations including the MHI. The recent sub-population decline at French Frigate Shoals is thought to have been caused by male aggression, shark attack, entanglement in marine debris, loss of habitat and decreased prey availability. The Hawaiian monk seal is assumed to be well below its optimum sustainable population, and, since 1993, the overall population has declined approximately 0.7% per year (Carretta et al. 2003). The Hawaiian monk seal is characterized as a strategic stock under the MMPA.

Monk seals feed on a wide variety of teleosts, cephalopods and crustaceans, indicating that they are highly opportunistic feeders (Rice 1964, MacDonald 1982, Goodman-Lowe 1999).

Evidence of interactions between monk seals and the Hawaii longline fishery began to accumulate in 1990, and included three hooked seals and 13 unusual wounds thought to have resulted from fishing interactions. In 1991, NMFS prohibited longline fishing within a Protected Species Zone which extends 50 nautical miles around the NWHI and includes the corridors between islands. Subsequent to the establishment of the Protected Species Zone there have been no reports of interactions between monk seals and the Hawaii longline fishery.

10.5 Seabirds

NMFS' observer records show that Hawaii-based pelagic longline fishing operations inadvertently hook and kill black-footed albatrosses (*Phoebastria nigripes*) and Laysan (*P. immutabilis*) albatrosses. On rare occasions, wedge-tailed (*Puffinus pacificus*) and sooty (*Puffinus griseus*) shearwaters are also incidentally hooked. Only seven shearwaters of various species were observed hooked by Hawaii-based longline vessels between 1994 and 2004. NMFS observers have also reported boobies hovering over baited hooks and that some birds may actually attempt a dive, however, no boobies have been reported hooked. The short-tailed albatross (*P. albatrus*) and Newell's shearwater (*Puffinus auricularis newelli*) are two seabird species listed under the Endangered Species Act present in the area where the Hawaii longline fishery operates. No short-tailed albatross or Newell's shearwater have been observed or reported taken by the longline fishery. Until recently, the only confirmed sighting of a short-tailed albatross near a Hawaii longline vessel was recorded on January 23, 2000, by a NMFS observer at 33° 9 N, 147° 49 W. The short-tailed albatross sighted was a juvenile bird. More recently, a short-tail albatross was observed near a shallow-setting vessel on November 18, 2004 and December 23, 2004. No sighting of a Newell's shearwater has been recorded for the fishery, and one is unlikely given the difficulty of distinguishing a Newell's shearwater from other shearwater species when in flight. Moreover, unlike albatrosses, which can and do make attempts at baited hooks deployed by longliners, interactions with shearwaters are extremely rare events. A total of five shearwaters have been caught and killed by the fishery, one fleshfooted shearwater, two sooty shearwaters and two unidentified shearwaters between 1994-2003 (NMFS PIRO observer data). No Newell's shearwaters have been recorded caught or killed by the Hawaii-based longline fishery. The US Fish & Wildlife Service has not expressed concern about this species' interactions with the Hawaii-based longline fishery in its Biological Opinions.

Between August 19, 2002 and October 28, 2002, NMFS observers collected information onboard pelagic vessels operating out of American Samoa and reported no seabird interactions. No albatross species are present in American Samoa. There are some shearwater species present, such as the wedge-tailed shearwater, that have the potential to lethally interact with longline gear. No reports or observed information on seabird/fishery interactions is available from pelagic fisheries operating in other areas under the Pelagics FMP. Therefore, the focus of this assessment is on the seabird species that are observed to interact, or have the potential to interact, with the Hawaii-based longline fishery.

10.5.1 Description of Potentially Affected Seabird Species

Albatrosses (Order Procellariiformes, Family Diomedeidae)
Three species of albatross breed and forage in the North Pacific: the short-tailed albatross, the black-footed albatross and the Laysan albatross (Table 9). NMFS observer data show that fishery-seabird interactions occur between the Hawaii-based longline fishery and two species of albatross: the black-footed albatross and the Laysan albatross. Neither the black-footed albatross nor the Laysan albatross are listed as endangered under ESA. Both seabirds are protected under the Migratory Bird Treaty Act (MBTA). Under the World Conservation Union (IUCN), the black-footed albatross is listed as "endangered" and the Laysan albatross as "vulnerable." The short-tailed albatross is listed as endangered under ESA and is considered "vulnerable" under IUCN. There have been no reports of interactions between the short-tailed albatross and the Hawaii-based longline fishery.

Albatross populations are particularly vulnerable to large-scale unnatural mortalities. Although albatrosses are long-lived (up to 60 years) they mature late (7-12 years) (Marchant and Higgins, 1990; Robertson, 1995; Bergin, 1997), produce only a single chick every one to three years (Marchant and Higgins, 1990) and both parents are typically required to successfully fledge their chick (Fisher, 1971; Fisher, 1975). Thus the loss of one parent may lead to the loss of the pair's chick as well as to the less successful mating of the remaining member of the pair for years to come (Richdale, 1950; Fisher, 1972; Cousins and Cooper, 2000). Albatrosses may return to the breeding colonies at two or three years of age but the average age at first breeding is seven or eight years (Rice and Keyon, 1962; Hasegawa and DeGange, 1982). Albatrosses fit the model of a “K-selected” species (MacArthur and Wilson, 1967; Pianka, 1970): slow development, late reproduction, large body size and a low potential rate of population. Populations of K-selected species do not bounce back rapidly from severe declines in population size and are therefore at greater risk of local, and inevitably global extinction from such declines.

Albatrosses are nest site specific and lay a single egg during a breeding season. But albatrosses may not breed every year. Albatrosses are dependent upon their flight feathers for foraging and must take time from breeding to molt and grow new flight feathers. As a consequence, it is estimated that at any one time approximately 25% of an albatross population may not return to breed (Cochrane and Starfield, 1999).

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122
Box 50088
Honolulu, Hawaii 96850

TAKE PRIDE IN AMERICA

In Reply Refer To:
1-2-1999-F-02.2

OCT - 8 2004

William L. Robinson, Regional Administrator
Pacific Islands Regional Office
National Marine Fisheries Service
1601 Kapiolani Boulevard, #1110
Honolulu, Hawaii 96814-2937

Subject: U.S. Fish and Wildlife Service Biological Opinion under section 7 of the Endangered Species Act on the effects of the reopened shallow-set sector of the Hawaii-based longline fishery on the short-tailed albatross (*Phoebastria albatrus*), formal consultation log number 1-2-1999-F-02.2 (supplementing 1-2-1999-F-02R)

Dear Mr. Robinson:

Enclosed please find the biological opinion of the U.S. Fish and Wildlife Service (Service) on the effects of the reopened shallow-set sector of the Hawaii-based longline fishery on the endangered short-tailed albatross (*Phoebastria albatrus*), Service consultation log number 1-2-1999-F-02.2. This biological opinion examines only the effects of the reopened shallow-set sector of the fishery on the short-tailed albatross. Therefore, our Biological Opinion issued on November 18, 2002 (November 2002 Opinion; log number 1-2-1999-F-02R) on the deep-set sector of the fishery remains in effect and is supplemented by the enclosed biological opinion.

Consultation on the effects of Hawaii-based longline operations on the short-tailed albatross was triggered originally (in 1999) by the record of take of this species in Alaska longline fisheries, the presence of a small number of short-tailed albatrosses in the Northwestern Hawaiian Islands, and the observed mortality of two other, similar species, the black-footed (*P. nigripes*) and Laysan (*P. immutabilis*) albatrosses, resulting from Hawaii-based pelagic longline fishing. We issued our original biological opinion on November 28, 2000 (log number 1-2-1999-F-02). Consultation was reinitiated in 2001 because of the court-ordered suspension of shallow-set, or swordfish-target, longlining in Hawaii-based fishery. The resulting biological opinion, which we issued to the National Marine Fisheries Service (NOAA Fisheries) on November 18, 2002, (November 2002 Opinion; Log Number 1-2-1999-F-02R) examined the effects of a deep-set, or tuna-target, fishery on the short-tailed albatross, because this was the only type of longline fishing permitted for Hawaii-based vessels.

The current consultation was triggered by the proposed reopening of shallow-set fishing in the Hawaii-based longline fishery. Prior to its cessation in 2001, shallow-set longline fishing was documented to account for the majority of seabird mortality in the Hawaii-based longline fishery. The reopening of this sector of the fishery therefore was sufficient to trigger new consultation under section 7 of the Endangered Species Act because it constitutes a modification to the fishery causing effects to the short-tailed albatross not considered in the November 2002 Opinion.

We appreciate the ongoing collaboration of NOAA Fisheries with us on the completion of this consultation. We look forward to learning about the current voluntary implementation of side setting in the Hawaii-based longline fishery and reviewing observer data from these vessels. If you have any questions, please contact Fish and Wildlife Biologist Holly Freifeld by telephone at (808) 792-9400.

Sincerely,

Gina Shultz

for Jeff M. Newman
Acting Field Supervisor

Attachments:
Biological Opinion
Literature and references cited
Appendices

U.S. FISH AND WILDLIFE SERVICE
BIOLOGICAL OPINION ON THE EFFECTS OF THE REOPENED SHALLOW-SET SECTOR OF THE HAWAII-BASED LONGLINE FISHERY ON THE SHORT-TAILED ALBATROSS (*Phoebastria albatrus*)

Formal Consultation Log Number 1-2-1999-F-02.2

October 8, 2004

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CONSULTATION HISTORY

Please see the November 2000 Opinion and the November 2002 revised Opinion for the history of previous consultations.

August 31, 2003: The Washington, D.C. District Court issued a ruling that vacated National Marine Fisheries Service's (NOAA Fisheries) June 12, 2002, rule, effectively invalidating the prohibition on targeting swordfish in the Hawaii-based longline fishery. Because the November 18, 2002 revised biological opinion for the short-tailed albatross examined the effects of a tuna-only fishery, NOAA Fisheries now was vulnerable, *i.e.*, not legally permitted, for take of short-tailed albatrosses by vessels targeting swordfish.

October 6, 2003: In response to several requests for stays of the August 31 ruling to provide NOAA Fisheries time to put new regulations in place to protect sea turtles, the court granted a stay and reinstated the existing regulations until April 1, 2004.

November 19, 2003: NOAA Fisheries and U.S. Fish and Wildlife Service (Service) biologists met to discuss upcoming changes to the Hawaii-based longline fishery and a reinitiated consultation on the effects of these changes on the short-tailed albatross. Participants included: Service – Holly Freifeld, NOAA Fisheries – Alvin Katekaru and Karla Gore.

January 23, 2004: In an email, NOAA Fisheries transmitted to the Service a draft letter requesting reinitiation of consultation under section 7 of the Endangered Species Act (Act) on the short-tailed albatross (Karla Gore, pers. comm., 2004). The Service responded that day with comments on the draft letter (Holly Freifeld, pers. comm., 2004).

January 28, 2004: NOAA Fisheries published a proposed rule in the *Federal Register* to implement regulatory amendments to the Fisheries Management Plan for the Pelagic Fisheries of the Western Pacific Region (Pelagics FMP). These amendments included reopening shallow-set sector of fishery under a new set of management conditions intended to reduce the incidental take of sea turtles.

February 23, 2004: NOAA Fisheries issued a biological opinion on the proposed amendments to the Pelagics FMP. This biological opinion examined the effects of the amendments on sea turtles.

March 3, 2004: The Service received a letter from NOAA Fisheries dated February 27, 2004, requesting reinitiation of section 7 consultation on the short-tailed albatross (Sam Pooley, *in litt.*, 2004).

March 11, 2004: Service and NOAA Fisheries staff met to discuss the upcoming consultation, and to discuss additional information needed to reinitiate consultation, including clarification of the status of the Hawaii Longline Association (HLA) as a possible applicant in the consultation.

Participants included: Service – Holly Freifeld, NOAA Fisheries – Alvin Katekaru and Karla Gore.

March 12, 2004: The Service received a letter addressed to NOAA Fisheries and the Service from HLA's legal counsel, Stoel Rives, which notified the agencies that HLA was entitled to applicant status under a Federal district court ruling that found in favor of HLA on this issue. The letter also requested that the Western Pacific Regional Fisheries Management Council (WPRFMC) be included in consultation as well, and informed the agencies that HLA and WPRFMC were preparing a biological assessment of the effects of the Hawaii-based longline fishery on the short-tailed albatross (Jeff Leppo, *in litt.*, 2004).

March 19, 2004: In a letter, the Service requested clarification from NOAA Fisheries on several points in their February 27, 2004 reinitiation letter. This clarification was needed before the Service could reinitiate consultation (Gina Shultz, *in litt.*, 2004).

March 24, 2004: In a telephone conversation, NOAA Fisheries staff confirmed that HLA would be their applicant in this consultation (Alvin Katekaru, pers. comm., 2004).

March 25, 2004: The Service received a copy of a letter from NOAA Fisheries to Stoel Rives confirming HLA's status as an applicant in this consultation and welcoming the informal participation of WPRFMC staff, although WPRFMC would not be an applicant (Sam Pooley, *in litt.*, 2004).

March 26, 2004: In an email, the Service provided comments on NOAA Fisheries' draft response to our March 19 letter (Holly Freifeld, pers. comm., 2004).

March 26, 2004: Service, NOAA Fisheries, HLA, and WPRFMC staff met to discuss a tentative schedule for consultation, the role of HLA as an applicant, and the participation of WPRFMC. Participants included: Service – Gina Shultz, Marilet Zablan, Holly Freifeld; NOAA Fisheries – Alvin Katekaru, Karla Gore; HLA – Jim Cook and Sean Martin; WPRFMC – Marcia Hamilton and Irene Kinan.

March 29, 2004: In a letter, NOAA Fisheries responded to the Service's March 19 letter. This letter provided (1) official verification of HLA's applicant status, (2) NOAA Fisheries' assessment of how the proposed action may adversely affect (take) the short-tailed albatross, and (3) information regarding the biological assessment in preparation by WPRFMC on behalf of HLA (Sam Pooley, *in litt.*, 2004).

April 2, 2004: NOAA Fisheries published a final rule in the *Federal Register* codifying some of the Terms and Conditions of their February 23, 2004 Biological Opinion addressing the effects of the fishery on sea turtles (69 FR 17329).

April 2, 2004: In a letter, the Service acknowledged receipt of NOAA Fisheries' March 29, 2004, letter, and confirmed reinitiation of consultation as of March 3, 2004 (R. Mark Sattelberg, *in litt.*, 2004).

April 15, 2004: In an email, the Service transmitted to NOAA Fisheries a draft of the description of the proposed action (Holly Freifeld, pers. comm., 2004).

April 19, 2004: In a letter, the WPRFMC informed the Service of the regulatory amendment process underway to incorporate seabird deterrents into the Pelagics FMP and requested comments from the Service on the five seabird deterrent alternatives WPRFMC was considering (Kitty Simonds, *in litt.*, 2004).

April 28, 2004: NOAA Fisheries convened a teleconference with Service, HLA, and WPRFMC staff to provide an update on consultation progress. Participants included Service – Holly Freifeld; NOAA Fisheries – Karla Gore and Alvin Katekaru; HLA (Stoel Rives) – Jim Lynch and Jeff Leppo; WPRFMC – Marcia Hamilton and Irene Kinan.

May 5, 2004: In a written response to the April 19 letter from WPRFMC, the Service transmitted comments on the draft list of seabird deterrents (R. Mark Sattelberg, *in litt.*, 2004).

May 5, 2004: In an email, NOAA Fisheries transmitted comments on the draft description of the proposed action. These comments did not include HLA comments (Karla Gore, pers. comm., 2004).

May 18, 2004: A conference call was held among Service, NOAA Fisheries, HLA, and WPRFMC staff to discuss the calculation of incidental take and potential terms and conditions for the new biological opinion. Participants included Service – Holly Freifeld; NOAA Fisheries – Karla Gore, Alvin Katekaru; HLA – Jim Cook, Sean Martin; Stoel Rives – Jeff Leppo, Jim Lynch; WPRFMC – Marcia Hamilton.

May 20, 2004: NOAA Fisheries transmitted to the Service a Biological Assessment of the Pelagics New Technologies Regulatory Amendment, prepared by HLA and WPRFMC. This document was submitted as "a source for background information to the ongoing short-tailed albatross consultation" (Sam Pooley, *in litt.*, 2004).

June 1, 2004: In an email, the Service requested clarification from NOAA Fisheries about whether their proposed action included the entire fishery or only the reopened swordfish fishery (Holly Freifeld, pers. comm., 2004).

June 3, 2004: A meeting was held among Service, NOAA Fisheries, HLA, and WPRFMC staff to discuss the timing of the WPRFMC and NOAA Fisheries regulatory amendment process and whether the consultation should consider the entire fishery or only the reopened swordfish fishery. Participants included Service – Holly Freifeld; NOAA Fisheries – Karla Gore, Alvin Katekaru; HLA (Stoel Rives) –Jim Lynch; WPRFMC – Marcia Hamilton, Irene Kinan.

June 16, 2004: In an email, the Service transmitted to NOAA Fisheries a revised draft of the description of the proposed action with requests for addition information (Holly Freifeld, pers. comm., 2004).

June 21, 2004: In a letter, NOAA Fisheries clarified that their proposed action under section 7 consultation was only the reopened swordfish fishery. The letter described the change to the tuna fishery, the opening of the Seasonal Area Closure, as not constituting a change to that fishery sufficient to warrant reinitiating consultation and revising the November 2002 Opinion (William Robinson, *in litt.*, 2004).

June 25, 2004: In an email, the Service transmitted to NOAA Fisheries a draft of the Effects of the Action section of the biological opinion for review (Holly Freifeld, pers. comm., 2004).

June 29, 2004: In an email, NOAA Fisheries provided the Service with their final comments and information on the description of the proposed action (Karla Gore, pers. comm., 2004).

July 1, 2004: In an email, NOAA Fisheries provided their comments on the draft of the Effects of the Action section. No HLA comments were included (Karla Gore, pers. comm., 2004).

July 1, 2004: In an email, the Service transmitted to NOAA Fisheries a draft of the conservation recommendations for the biological opinion (Holly Freifeld, pers. comm., 2004).

July 2, 2004: In an email, the Service transmitted to NOAA Fisheries a draft of the consultation history for the biological opinion (Holly Freifeld, pers. comm., 2004).

July 7, 2004: In an email, the Service transmitted to NOAA Fisheries a draft of the conclusion of the biological opinion, including the Incidental Take Statement, Reasonable and Prudent Measures, and Terms and Conditions for minimizing the incidental take of the short-tailed albatross (Holly Freifeld, pers. comm., 2004).

July 8, 2004: In an email, the Service transmitted to NOAA Fisheries a draft of the Status of the Species section of the biological opinion (Holly Freifeld, pers. comm., 2004).

July 8, 2004: In a telephone conversation, NOAA Fisheries transmitted some preliminary comments from HLA on the draft Effects of the Action section of the biological opinion (Karla Gore, pers. comm., 2004).

July 9, 2004: In an email, the Service transmitted to NOAA Fisheries a draft of the Environmental Baseline section of the biological opinion. We also alerted NOAA Fisheries of the likely need for an extension of the deadline for issuance of the biological opinion to address HLA's comments on the draft sections, as HLA's comments had not yet been received (Holly Freifeld, pers. comm., 2004).

July 9, 2004: In a telephone conversation, NOAA Fisheries indicated that they and HLA recognized the likely need for an extension of the deadline for issuance of the final biological opinion. NOAA Fisheries also indicated that they hope to receive complete written comments from HLA on the draft sections of the biological opinion by July 12 (Karla Gore, pers. comm., 2004).

July 12, 2004: In an email, NOAA Fisheries transmitted their and HLA's comments on the proposed action description for the biological opinion (Karla Gore, pers. comm. 2004).

July 13, 2004: In a telephone conference, Service, NOAA Fisheries, HLA and WPRFMC staff met to discuss comments on the draft sections of the biological opinion. Because of the nature of some of the comments and the Service's internal schedule for review of the final draft biological opinion, all parties agreed to an extension for issuance of the final biological opinion. Participants included Service – Holly Freifeld; NOAA Fisheries – Karla Gore, Alvin Katekaru; HLA (Stoel Rives) – Jim Lynch; WPRFMC – Marcia Hamilton.

July 16, 2004: In several emails, NOAA Fisheries transmitted their and HLA's comments on the draft Effects of the Action section of the biological opinion, and forwarded comments on the draft incidental take calculation from Chris Boggs, of NOAA Fisheries' Pacific Islands Fisheries Science Center (Karla Gore, pers. comm., 2004).

July 16, 2004: In an email, NOAA Fisheries advised the Service that they had not yet received complete comments from HLA on draft sections of the biological opinion, and indicated that they agreed to an extension of the original due date (July 16) for issuance of the biological opinion (Karla Gore, pers. comm., 2004).

August 12, 2004: In an email, NOAA Fisheries transmitted their and HLA's comments on the draft incidental take statement, reasonable and prudent measures, and terms and conditions of the biological opinion (Karla Gore, pers. comm., 2004). In a telephone discussion later that day, NOAA Fisheries indicated that they and HLA had submitted comments on all draft sections of the biological opinion on which they wished to comment (Karla Gore, pers. comm., 2004).

August 18, 2004: In an email, the Service transmitted a revised draft of the calculation of incidental take (Holly Freifeld, pers. comm., 2004).

August 19, 2004: In a telephone conference, the Service, NOAA Fisheries, HLA, and WPRFMC discussed comments submitted on draft sections of the biological opinion and a target period for issuance of the final biological opinion. NOAA Fisheries and HLA indicated that they wished to review revised drafts of the incidental take calculation, incidental take statement, reasonable and prudent measures, and terms and conditions once more prior to issuance of the biological opinion. Participants included Service – Holly Freifeld; NOAA Fisheries – Karla Gore, Alvin Katekaru; HLA (Stoel Rives) – Jim Lynch; WPRFMC – Marcia Hamilton.

September 3, 2004: In a letter, HLA legal counsel Stoel Rives agreed to an extension on the due date for issuance of the final biological opinion until October 8, 2004 (Jim Lynch, *in litt.*, 2004).

September 8, 2004: In a telephone conference, HLA expressed concern that the lawsuit filed against NOAA Fisheries by Earthjustice on August 30 would cause the delay of or have other ramifications for the completion of the present consultation with regard to the Migratory Bird Treaty Act. Participants included Service – Holly Freifeld, Marilet Zablan, Gina Shultz; NOAA Fisheries –Alvin Katekaru; HLA (Stoel Rives) – Jim Lynch. HLA later conveyed that they would provide a memo or letter regarding the separate lawsuit (Alvin Katekaru, pers. comm., 2004).

September 10, 2004: In an email, the Service transmitted to NOAA Fisheries final review drafts of the incidental take calculation, incidental take statement, reasonable and prudent measures, and terms and conditions (Holly Freifeld, pers. comm., 2004).

September 13, 2004: In an email, HLA and WPRFMC indicated that they had no comments on the final review drafts of the incidental take calculation, incidental take statement, reasonable and prudent measures, and terms and conditions, which had been forwarded to them by NOAA Fisheries (Jim Lynch, pers. comm., 2004).

September 14, 2004: In an email, Alvin Katekaru of NOAA Fisheries indicated that he had no comments on the final review drafts of the incidental take calculation, incidental take statement, reasonable and prudent measures, and terms and conditions, and that he had forwarded the drafts to other NOAA Fisheries reviewers in the Sustainable Fisheries and Observer Programs (Alvin Katekaru, pers. comm., 2004).

September 15, 2004: In an email, NOAA Fisheries transmitted their final comments on the final review drafts (Tom Graham, pers. comm., 2004).

BIOLOGICAL OPINION

I. Description of the Proposed Action

The following text describing the proposed action and management measures is taken from or based on text from NOAA Fisheries' Biological Opinion on Proposed Regulatory Amendments to the Fishery Management Plan for Pelagic Fisheries of the Western Pacific Region, issued on February 23, 2004 (NOAA Fisheries 2004a), the U.S. Fish and Wildlife Service's Biological Opinion for the Effects of the Hawaii-based Domestic Longline Fleet on the Short-tailed Albatross (*Phoebastria albatrus*), issued on November 28, 2000, consultation log number 1-2-1999-F-02 (USFWS 2000; November 2000 Opinion), the revision of that Opinion issued on November 18, 2002, consultation log number 1-2-1999-F-02R (USFWS 2002; November 2002

Opinion), and the biological assessment prepared by HLA and WPRFMC concerning the Proposed Regulatory Amendments to the Fishery Management Plan (HLA and WPRFMC 2004).

The proposed action is the reopening of the shallow-set, or swordfish-target, sector of the Hawaii-based longline fishery, which has been closed since 2001. This consultation addresses all shallow-set longline fishing vessel-related activities regulated by NOAA Fisheries in the area of the Pacific Ocean where Hawaii-based longline fishing vessels operate and target pelagic species with shallow-set gear configuration within the range of the short-tailed albatross. The short-tailed albatross is listed as endangered throughout its range, including the United States. Therefore, this consultation addresses Hawaii-based longline fishing activities that occur in the U.S. Exclusive Economic Zone (EEZ), which is from 3 to 200 nautical miles (5.6 to 370 km) from shore, and in international waters, which are beyond 200 nautical miles (370 km) from shore.

The deep-set, or tuna-target sector of this fishery was the subject of a section 7 consultation that concluded with the issuance of a revised biological opinion on November 18, 2002. That biological opinion remains in effect for that sector of the Hawaii-based longline fishery. The Southern Area closure is an area from 0º to 15º north latitude and 145º to 180º west longitude which has been closed each year from April 1 to May 31 since 2001 (69 FR 17329, April 2, 2004). This area closure primarily affected the tuna fishery as that sector of the fishery generally fishes to the south of the Hawaiian Islands. Based on the best available scientific and commercial fisheries information, NOAA Fisheries has determined that the impact of removing the Southern Area is minor, inasmuch as seabird deterrents required in the terms and conditions of the November 2002 Opinion to minimize incidental take of short-tailed albatross in the tuna-target fishery are only required north of 23º north latitude, eight degrees north of the Southern Area Closure. The use of these deterrents therefore is unaffected by this change. Moreover, the location and one-month duration of the closure were instituted for protection of sea turtles and had little or no effect on the interaction of the fishery with seabirds.

Hawaii-based longline vessels are categorized by length as small vessels (<56 feet [ft] or 18.7 meters [m]), medium vessels (56-74 ft [18.7-24.7 m]), and large vessels (74-94 ft [24.7-31.3 m]). The shallow-set component of the fishery is limited to a total of 2,120 sets each year by Hawaii-based vessels. The Hawaii-based longline fishery operates under a limited entry program with vessel permits issued by NOAA Fisheries upon consideration of applications which may be submitted by vessel owners at any time. Fishing trips historically have been defined as tuna trips, swordfish trips, or mixed trips, but now will be defined by NOAA Fisheries strictly as either tuna (deep-set) or swordfish (shallow-set) trips.

NOAA Fisheries is an agency within the U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA). NOAA Fisheries manages the pelagic fisheries of the western Pacific region in the EEZ off Hawaii, Guam, the Commonwealth of the Northern Mariana Islands, American Samoa, and various other U.S. possessions in the Pacific under the authority of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson Act). Under the Magnuson Act, WPRFMC is responsible for developing Fishery Management Plans

(FMPs) and Amendments. If approved by NOAA Fisheries, these FMPs are implemented by NOAA Fisheries through the Federal rule-making process.

Hawaii-based longline swordfish-target (shallow-set) gear configuration

Swordfish-target fishing differs from tuna-target fishing in that the gear is set at a shallower depth, usually between 98 and 295 ft (30 and 90 m). Shallow-set longline gear is generally set at night, with luminescent light sticks, thought to attract swordfish, attached to the branch lines or gangions. Four to six gangions are typically clipped to the mainline between floats. A typical set for swordfish uses about 700 to 1,000 hooks. The shallow-set fishery historically used large, J-style hooks or typical "fish-hook" shaped hooks, with a straight shank ending in a recurved, barbed hook, and squid bait. Under the proposed action larger, offset circle-shaped hooks with mackerel-type bait will be required for shallow sets. The proposed action allows 2,120 shallow sets each year by the Hawaii-based longline fleet. These 2,120 sets will be equally allocated among holders of Hawaii longline limited access permits.

During swordfish trips, fishers traditionally set their longline gear late in the afternoon to early evening, as swordfish are known to rise from deeper waters and feed near the surface at night. The proposed action requires that gear deployment take place entirely at night (see below). Historically, the deployment and soak occurs at night in about 90 percent of swordfish sets (He *et al.* 1997). Fishing vessels travel at about 9 nautical miles (17 km) per hour when setting the line. Gear deployment usually takes about 6 hours, depending upon the length of the main line. Gear will soak for 6 to 7 hours. Haulback operations begin in the early morning hours around dawn, and usually take from 8 to 10 hours to retrieve all of the gear and catch. Fishing vessels travel at about 4 to 5 nautical miles (7 to 9 km) per hour during haulback operations (J. Cook, pers. comm. 1999).

Vessel activity

The Hawaii-based longline fishery operates year-round although vessel activity increases during the fall and is greatest during the winter and spring months. This is the largest FMP-regulated commercial fishery in the western Pacific region. The number of active vessels in the Hawaii-based longline fishery increased in the late 1980s and peaked at 141 vessels in 1991. The number of vessels has since ranged from 101 to 125. The number of active vessels has decreased by about 25 since 2000, and in 2002, 100 Hawaii-based longline vessels were active, all targeting tuna. Part of the decrease can be attributed to Hawaii-based longline vessels relocating to California to fish for swordfish when that sector of the Hawaii-based fishery was closed by court order to protect federally threatened and endangered sea turtles. The vessels that relocated to California de-registered their Hawaii longline limited entry permits, enabling them to continue to legally fish for swordfish. Approximately 35 vessels fished out of California in 2001.

The proposed action may result in an increase in the number of active vessels registered in the fishery, especially since the closure of swordfish-target longlining in the west coast-based fishery resulting from final regulations (69 FR 11540, March 11, 2004) for U.S. West Coast Fisheries for Highly Migratory Species, but the likely number of new vessels is unknown. As of May 1, 2004, 120 vessels had requested shallow-set certificates, but this number does not indicate how many vessels will actually use the certificates to target swordfish. Potentially important influences on the number of swordfish vessels returning to Hawaii include the cost of relocating and the costs and risks associated with having to acquire a sufficient number of shallow-set certificates to enable full operations.

Number of trips

The annual number of trips for the Hawaii-based longline fishery has remained relatively stable, but there has been a gradual shift from mixed-target and swordfish-target trips to tuna-target trips since 1991 (Fig. 1, below). An abrupt shift to all tuna-target trips took place with the suspension of all shallow setting in 2001. In 2002, Hawaii-based longline vessels made 1,162 trips. This represents an increase of 128 trips from 2001. In 2002, all trips were categorized as tuna-target trips.

The proposed action would allow 2,120 shallow sets to be made each year, which is equivalent to approximately 166 trips given the historical average of 13 sets per swordfish trip. This number of shallow sets represents approximately 50% of historical swordfish effort combined with the shallow-set component of historical mixed-target effort (D. Kobayashi, NOAA Fisheries, pers. comm. 2004).

Number of hooks set

The Hawaii-based longline fishery set a record number of hooks in 2002: 27 million (NOAA Fisheries unpublished data, cited in NOAA Fisheries 2004a; Table 1). This increase in number of hooks is a result of the shift in effort to tuna, which typically includes more than twice as many hooks per day fished than swordfish- or mixed-target trips.

Table 1. Number of hooks set* by the Hawaii-based longline fishing fleet, 1991-2001. Sources: Ito and Machado, 1999; T. Swenarton, pers. comm., 2004.

		Trip Type		
Year	Total	Swordfish	Tuna	Mixed
1991	11,914,608	2,243,375	5,124,277	4,546,956
1992	10,946,721	2,515,909	5,072,525	3,358,287
1993	12,137,533	3,207,976	6,359,162	2,570,395
1994	11,319,023	3,079.634	6,842,517	1,296,872
1995	14,155,169	1,464,589	10,186,299	2,504,281
1996	14,141,256	913,292	10,195,560	3,032,404
1997	15,564,321	840,539	12,207,913	2,515,869
1998	17,365,852	1,019,960	13,486,035	2,859,857
1999	19,145,304	669,909	15,468,935	3,106,749
2000	20,282826	425,532	16,991,509	2,655,156
2001	22,327,897	31,960	21,612,936	480,114

*Number of hooks set based on date of haulback.
Average hooks set per year, 1991 - 2001 = 15,390,956

<u>Action area</u>

The Hawaii-based longline fishery predominantly occurs in the Pacific Ocean between 1E and 50E north latitude, as far east as 135E west longitude, and as far west as 170E east longitude. The spatial distribution of effort in the tuna and swordfish components of the fishery between 1994 and 1999 is shown in Figures 2 and 3 (below). The swordfish component of the fishery historically has operated north of the Hawaiian archipelago and outside of the EEZ. The proposed action, which would allow a specific number of shallow sets, is therefore expected to result in an increase in longline effort in this northern area relative to 2001 and 2002. The proposed action also eliminates the seasonal closure in waters south of the Hawaiian archipelago, but as described above, that change was determined by NOAA Fisheries to have no effect on the short-tailed albatross.

Additional descriptions of the Hawaii longline fishery are included in other documents (Dollar 1991, Boggs and Ito 1993, Curran *et al*. 1996, He *et al.* 1997, WPRFMC 1998, Ito and Machado 1999, Bigelow *et al*. 1999, HLA and WPRFMC 2004, NOAA Fisheries 2004a, WPRFMC and NOAA Fisheries 2004).

Management and conservation measures

Under the Magnuson Act, U.S. pelagic fisheries in the central and western Pacific region are managed under the Fisheries Management Plan for Pelagic Fisheries of the Western Pacific Region (Pelagics FMP), as amended. The Pelagics FMP and its amendments (WPRFMC 1990, 1991, 1992, 1994) are developed by the WPRFMC under the authority of the Magnuson Act, and if these are approved by NOAA Fisheries, NOAA Fisheries implements them. The objective of the Pelagics FMP is to maximize the net benefits of the fisheries to the western Pacific region and the Nation. Background information on Federal fisheries policy and management under the Magnuson Act, the fishery management plan development process, and the Pelagics FMP is described in the March 2001 Final Environmental Impact Statement (Section 1.3, pages 11 - 34).

The proposed action under consultation is comprehensively described in NOAA Fisheries' April 2, 2004 final rule implementing regulatory amendment of the FMP (69 FR 17329) and in the biological assessment prepared by HLA and WPRFMC (2004). The rule includes numerous changes for the Hawaii-based longline fishery, including implementation of circle hooks and mackerel-type baits designed to minimize interactions with sea turtles. The management measures that constitute the action under consideration are summarized as follows:

- As directed by NOAA Fisheries, all vessels registered for use with Hawaii longline limited access permits (Hawaii longliner) must carry NOAA Fisheries-owned "vessel monitoring system" transmitters (59 FR 58789, November 15, 1994).

- All Hawaii-based longline vessels and fishing vessels registered for use with longline general permits are required to employ sea turtle handling measures specified by NOAA Fisheries, including mitigation gear, sea turtle resuscitation, and sea turtle release procedures, to maximize the survival of sea turtles that are accidentally taken by fishing gear (65 FR16346, March 28, 2000; future measures).

- Hawaii-based longline vessels operating north of 23 degrees North latitude (23°N) must: when using traditional tarred mainline, basket-style longline gear, ensure that the main longline is deployed slack to maximize its sink rate; when making deep sets using monofilament main longline, use a line-setting machine or line shooter and attach a weight of at least 45 grams (1.6 ounces) to each branch line within 1 m (3 ft) of each hook; use thawed blue-dyed bait; and discharge offal strategically (67 FR 34408, May 14, 2002).

- The operator and crew of all Hawaii-based longline vessels that accidentally hook or entangle an endangered short-tailed albatross must employ specific handling procedures (67 FR 34408, May 14, 2002).

- Operators and owners of Hawaii-based longline vessels and operators of registered for use under longline general permits are required to attend annual protected species workshops conducted by NOAA Fisheries that cover sea turtle and seabird conservation and deterrent techniques (67 FR 34408, May 14, 2002; future measures).

- There is an annual limit on the number of longline shallow sets that may be collectively made north of the equator by Hawaii-based longline vessels, set at 2,120 shallow-sets per year, which is divided and distributed each calendar year in equal portions in the form of transferable single-set certificates to all holders of Hawaii longline limited access permits that respond positively to an annual solicitation of interest from NOAA Fisheries. Shallow setting means the deployment of longline gear with any float line less than 65 ft (20 m) in length, with fewer than 15 branch lines between any two floats (except basket-style longline gear, the threshold for which is 10 branch lines between any two floats), with the use of lightsticks, or resulting in the possession or landing of more than 10 swordfish at any time during a given trip. Hawaii-based longline vessels are required to have on board, and to submit to NOAA Fisheries at the end of each trip, one valid shallow-set certificate for every shallow set made north of the equator (69 FR 17329, April 2, 2004).

- Hawaii-based longline vessels, when making shallow sets north of the equator, must use circle hooks sized 18/0 or larger with a 10-degree offset and only mackerel-type bait. These gear changes are thought to reduce the incidental take of sea turtles (NOAA Fisheries 2004a) (69 FR 17329, April 2, 2004).

- There are annual limits on the numbers of interactions between leatherback and loggerhead sea turtles and Hawaii-based longline vessels while engaged in shallow setting (69 FR 17329, April 2, 2004).

- The limit for each sea turtle species is equal to the annual estimated incidental take for the species in the shallow-set component of the Hawaii-based fishery (either incidental captures or incidental deaths, whichever limit is reached first) as established in the prevailing biological opinion issued by NOAA Fisheries pursuant to section 7 of the Act. When either one of the turtle interaction limits is reached, as determined from estimates derived from vessel observer data, the shallow-set component of the Hawaii-based longline fishery is closed for the remainder of the calendar year, after giving one week advance notice of such closure to all holders of Hawaii longline limited access permits (69 FR 17329, April 2, 2004).

- Operators of Hawaii-based longline vessels are required to notify the NOAA Fisheries Regional Administrator in advance of every trip whether the trip will involve shallow setting or deep setting, and such vessels are required to make sets only of the type declared (69 FR 17329, April 2, 2004).

- Operators of Hawaii-based longline vessels are required to carry and use NOAA Fisheries-approved de-hooking devices for sea turtles caught on longline gear (69 FR 17329, April 2, 2004).

- Hawaii-based longline vessels, when making shallow-sets north of 23°N, are required to start and complete the line-setting procedure during the nighttime, specifically, no earlier than one hour after local sunset and no later than local sunrise. This measure derives from the Service's November 28, 2000 biological opinion (69 FR 17329, April 2, 2004).

- Existing regulations require Hawaii-based longline vessels to accept vessel observers if required to do so by NOAA Fisheries, and NOAA Fisheries' February 23, 2004, biological opinion mandates 100% observer coverage for the shallow-set fishery, that is, every Hawaii-based longline vessel leaving port to target swordfish will carry a NOAA Fisheries observer. NOAA Fisheries intends to have 100% observer coverage in this fishery (69 FR 17329, April 2, 2004).

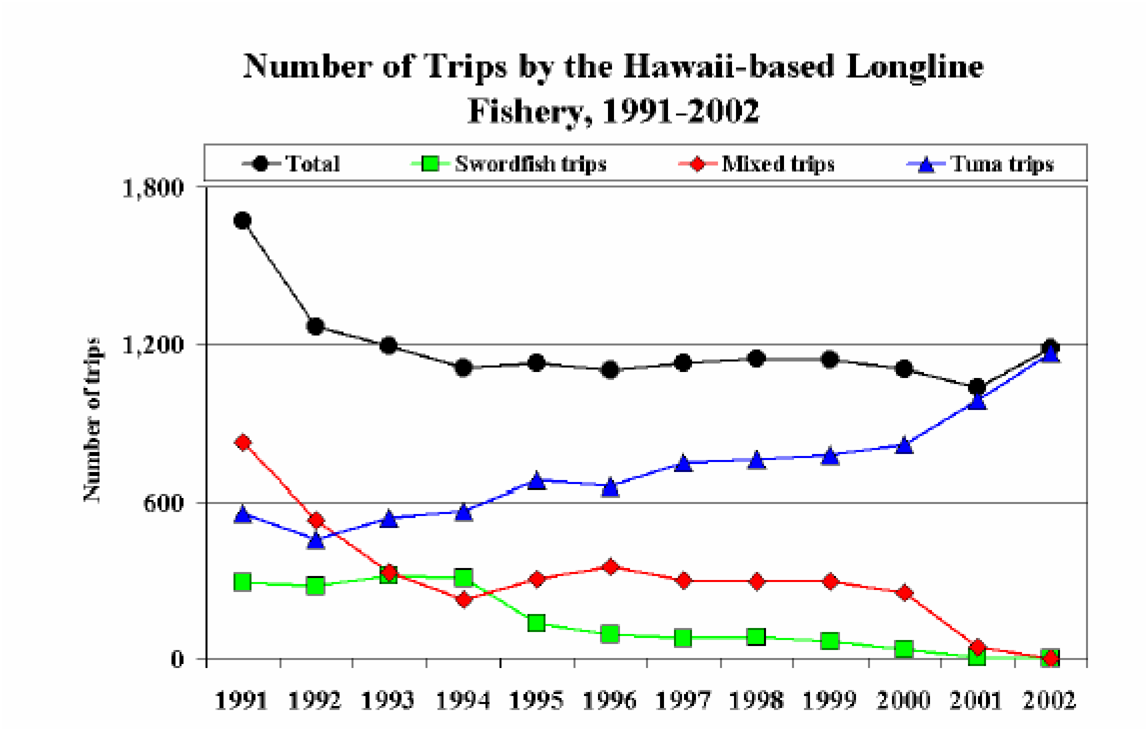


Figure 1. Number of trips in the Hawaii-based longline fishery, 1991-2002. Sources: Ito and Machado 2001, NOAA Fisheries unpublished data.

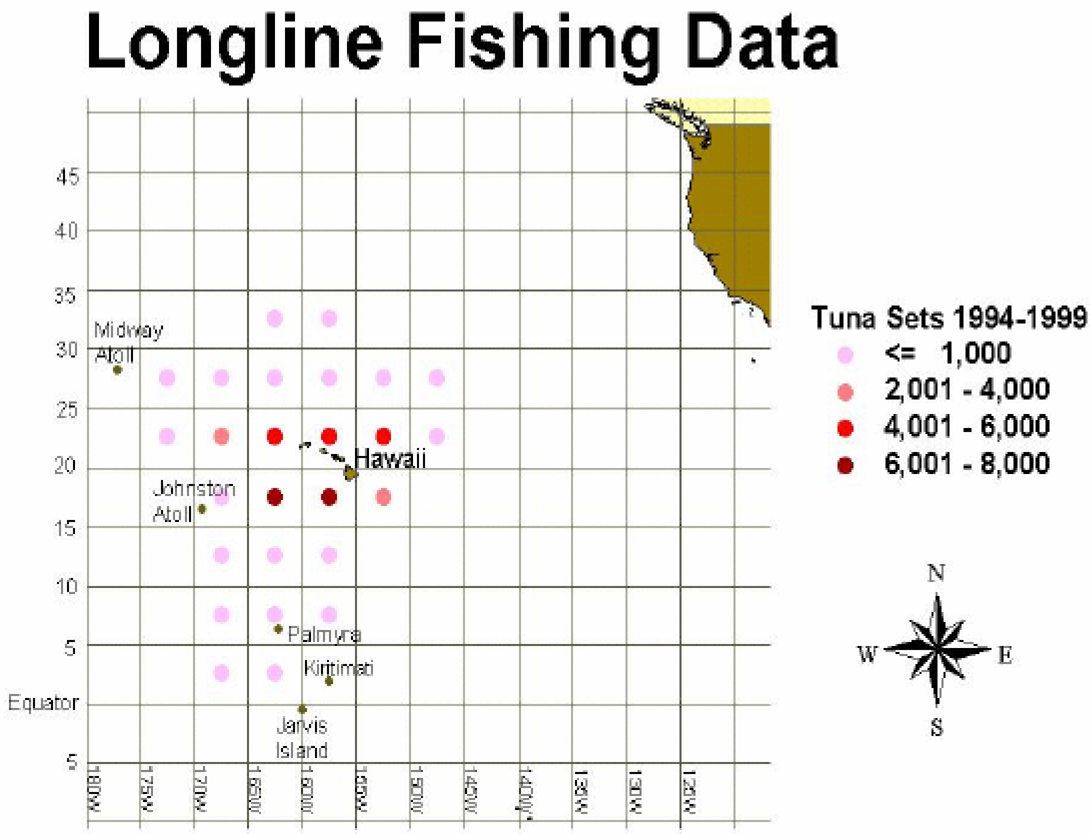


Figure 2. Distribution of fishing effort by the tuna sector of the Hawaii-based longline fishery, 1994-1999. Source: NOAA Fisheries 2004a.

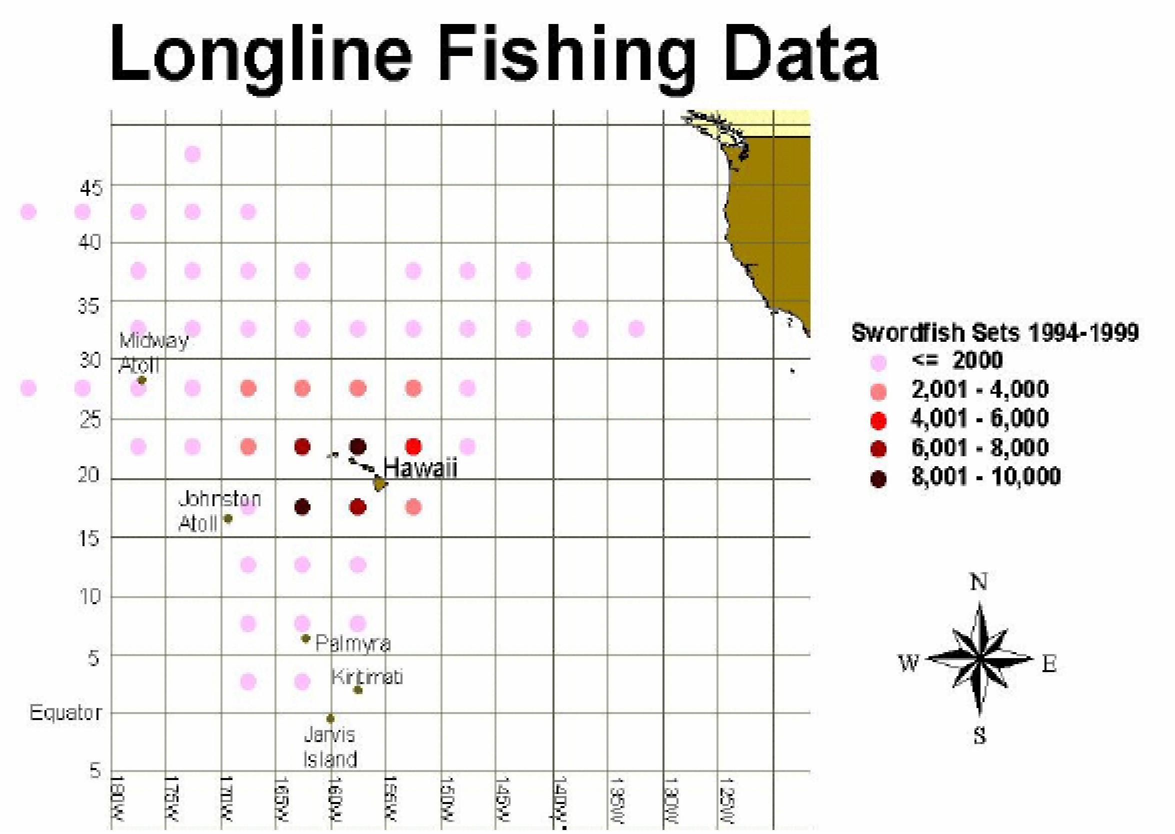


Figure 3. Distribution of fishing effort by the swordfish sector of the Hawaii-based longline fishery 1994-1999. Source: NOAA Fisheries 2004a.

II. Status of the Species

A. Species Description

George Steller provided the first record of the short-tailed albatross in the 1740s. The type specimen for the species was collected offshore of Kamchatka, Russia, and was described in 1769 by P.S. Pallas in Specilegia Zoologica (AOU 1998). In the order of tubenose marine birds, Procellariiformes, the short-tailed albatross is classified within the family Diomedeidae. Until recently, it was assigned to the genus *Diomedea*. Following results of the genetic studies by Nunn *et al*. (1996), the family Diomedeidae was arranged in four genera. The genus *Phoebastria*, North Pacific albatrosses, now includes the short-tailed albatross, the Laysan albatross (*P. immutabilis*), the black-footed albatross (*P. nigripes*), and the waved albatross (*P. irrorata*) (AOU 1998).

The short-tailed albatross is a large pelagic bird with long narrow wings adapted for soaring just above the ocean surface. The bill is disproportionately large compared with that of the other two northern hemisphere albatrosses; it is pink and hooked with a bluish tip, has external tubular nostrils, and has a thin but conspicuous black line extending around the base. Adult short-tailed albatrosses are the only northern Pacific albatross with an entirely white back. The white head develops a yellow-gold crown and nape in mature adult birds, but this plumage is not a prerequisite for breeding. Newly fledged birds are dark brown-black, but soon obtain pale bills and legs that distinguish them from black-footed albatross (Tuck 1978, Robertson 1980). Subadult birds have mixed white and brown-black areas of plumage, gradually getting more white feathers at each molt until reaching fully mature plumage.

B. Life History

Available evidence from historical accounts and from current breeding sites indicates that short-tailed albatross nesting habitat is characterized by flat or sloped sites with sparse or full vegetation on isolated windswept offshore islands with restricted human access (Arnoff 1960, Sherburne 1993, DeGange 1981). Current nesting habitat on Torishima Island is steep sites on soil containing loose volcanic ash; the island is dominated by a grass, *Miscanthus sinensis* var. *condensatus*, but a composite, *Chrysanthemum pacificum*, and a nettle, *Boehmeria biloba*, are also present (Hasegawa 1977). The grass probably stabilizes the soil, provides protection from weather, and minimizes mutual interference between nesting pairs while allowing for safe, open take-offs and landings (Hasegawa 1978). The nest is a grass- or moss-lined concave scoop about 2 ft (0.75 m) in diameter (Tickell 1975).

Short-tailed albatrosses are long-lived and slow to mature; the average age at first breeding is about 6 years (Service 1999). As many as 25 percent of breeding age adults may not return to the colony in a given year (Service 1999; Cochrane and Starfield 1999). Females lay a single egg each year, which is not replaced if destroyed (Austin 1949). Adult and juvenile survival rates are high (96 percent), and an average of 0.24 chicks per adult bird in the colony survive to fledge at six months of age (Cochrane and Starfield 1999). However, chick survival can be reduced severely in years when catastrophic volcanic or weather events occur during the breeding season.

At Torishima, birds arrive at the breeding colony in October and begin nest building. Egg-laying begins in late October and continues through late November. The female lays a single egg; incubation involves both parents and lasts for 64-65 days. Eggs hatch in late December and January, and by late May or early June the chicks are almost fully grown and the adults begin abandoning their nests (Service 1999; Hasegawa and DeGange 1982). The only known currently active breeding colonies of short-tailed albatross are on Torishima and Minami-kojima islands, Japan. The chicks fledge soon after the adults leave the colony, and by mid-July, the colony is deserted (Austin 1949). Non-breeders and failed breeders disperse from the breeding colony in late winter through spring (Hasegawa and DeGange 1982). There is no detailed information on phenology on Minami-kojima, but it is believed to be similar to that on Torishima. The political status of Minami-kojima is contested by Japan, Taiwan, and China; for this reason, human access to this island is extremely difficult.

Similar to other albatrosses, short-tailed albatrosses are monogamous and highly philopatric. Chicks hatched at Torishima return there to breed. However, individual birds may occasionally disperse from their natal colonies to breed, as evidenced by the appearance of adult birds banded as chicks on Torishima displaying courtship behavior at Midway Atoll (Service 1999, Richardson 1994).

The diet of short-tailed albatrosses includes squid, fish, flying fish eggs, and shrimp and other crustaceans (Hattori in Austin 1949, Service 1999). There is currently no information on variation of diet by season, habitat, or environmental condition.

Overall, the worldwide population of the short-tailed albatross has increased steadily over the past several decades (Fig. 4; Table 2). Observed annual increases in adults present at the colony, eggs laid, and chicks fledged indicate that the population at Torishima is estimated to be growing at a rate of between 6.5 and 7.5% per year.

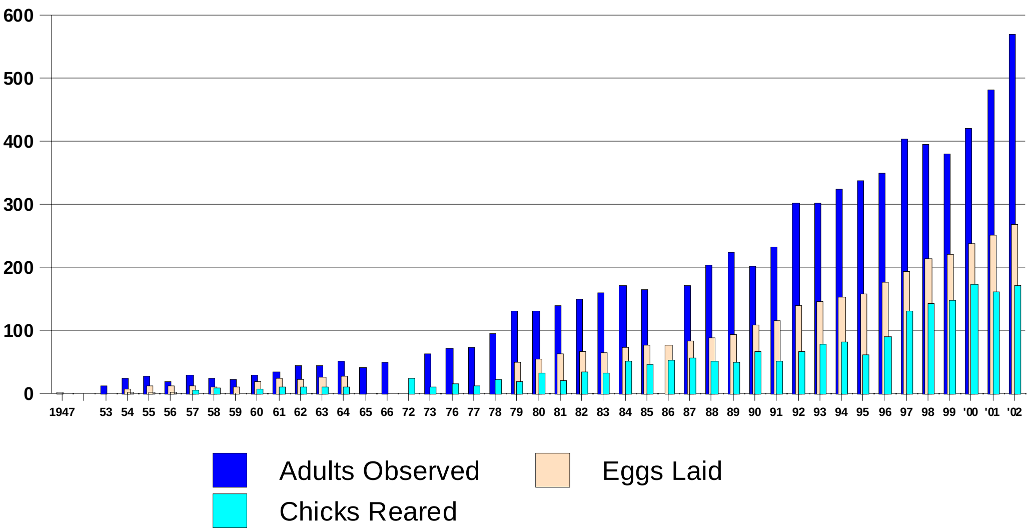


Figure 4. Short-tailed albatross population data from Torishima Islands, Japan (H. Hasegawa, pers. comm., 2003).

Table 2. Short-tailed albatross productivity, Torishima, Japan. Source: H. Hasegawa, pers. comm., 2004).

Fledge year	Birds on colony (excluding chicks)	Eggs	Fledged chicks
1995	324	153	82
1996	337	158	62
1997	349	176	90

Table 2, continued.

Fledge year	Birds on colony (excluding chicks)	Eggs	Fledged chicks
1998	403	194	130
1999	394	213	143
2000	c.380	220	148
2001	c.420	238	173
2002	481	251	161
2003	569	267	171
2004	603	277	193

C. Population Dynamics

The short-tailed albatross currently nests at two sites in the western Pacific Ocean: 1) Torishima, and 2) the Senkaku Islands. On the island of Torishima, most pairs nest at the Tsubame-zaki site, but a new colony is beginning to form on the northwest slope of the island. In the Senkaku Islands, most pairs nest on Minami-kojima, but in 2002 a chick also fledged from Kita-kojima, a nearby island.

Available data

The breeding success and population numbers of short-tailed albatrosses breeding on Torishima have been systematically monitored since 1976. Since 1976, Dr. Hiroshi Hasegawa has made annual trips to Torishima to count the number of eggs laid and chicks fledged. He has banded all chicks on the island since 1977. In the Senkaku Islands, chick counts were made in 1988, 1991, 1992, 2001, and 2002. No visits were made to the Senkaku Islands in 2003 or 2004.

Combining field data and modeling to estimate population size

Field data alone do not allow us to estimate the size of the short-tailed albatross population for the following reasons: 1) the number of eggs laid underestimates the total number of breeding pairs because not all breeding birds nest each year, 2) there is no reliable method for counting subadults in the population, and 3) data are collected opportunistically in the Senkaku Islands, so annual population indices are frequently unavailable. Therefore, to estimate the short-tailed albatross population size, it is necessary to combine available data with model predictions of missing values.

Sievert (2004) developed a simulation model that predicts the growth of the short-tailed albatross population on Torishima and the Senkaku Islands using estimated rates of age-specific survival and fecundity. Estimated model parameters for the two populations are:

Torishima:
1) Annual reproductive success = 64%,
2) Annual subadult survival = 94.1%
3) Annual adult survival = 96.7%
4) Percentage of adults breeding each year = 75%
5) All birds begin to breed at 6 years of age
These values were determined by running the population simulation model iteratively with different combinations of parameter values, within realistic ranges for albatross populations, until the best fit to the observed annual population growth of 7.5% was obtained. Observed rates of population growth were calculated using annual counts of fledglings. Observed reproductive success (chicks fledged/eggs laid) was used to guide selection of the reproductive success parameter in the model.

Senkaku Islands:
1) Annual reproductive success = 75%
2) Annual subadult survival = 96.5%
3) Annual adult survival = 98%
4) Percentage of adults breeding each year = 80%
5) All birds begin to breed at 6 years of age
These values were determined by running the population simulation model iteratively with different combinations of parameter values, within realistic ranges for albatross populations, until the best fit to the observed annual population growth of 11.0% was obtained. Observed rates of population growth were calculated using chick count data.

The estimated size of the short-tailed albatross population in 2004 is 1,990 individuals, of which 83% are associated with Torishima (Table 3). Due to the lack of frequent visits to the Senkaku Islands, the population estimate for those islands is likely to be less reliable than that for Torishima, where several visits are made annually.

Table 3. Short-tailed albatross population size in 2004, estimated using a combination of field research and simulation modeling (see text).

Age	Torishima	Senkaku Islands	Both Colonies
Fledglings	186	42	228
1-5 yrs old	634	141	775
Adult	832	155	987
All ages	1,652	338	**1,990**

D. Distribution and Population Status

Distribution

The short-tailed albatross once ranged throughout most of the North Pacific Ocean and Bering Sea, with known nesting colonies on numerous western Pacific Islands in Japan and Taiwan (Hasegawa 1979, King 1981). The discovery of a fossil short-tailed albatross colony on Bermuda dating to the mid-Pleistocene (420,000 to 362,000 years ago) confirms that this species once nested in the North Atlantic (Olson and Hearty 2003). Given its current nesting distribution, it is possible that the prehistoric breeding range of the short-tailed albatross was continuous across the north Pacific and included islands east of Japan. Short-tailed albatross courtship behavior and reproductive activities have been observed at Midway Atoll National Wildlife Refuge. The ability of Midway Atoll National Wildlife Refuge to serve as a successful nesting colony, through either natural colonization or translocation efforts, remains unknown (Service 1999).

At the beginning of the 20th century, the short-tailed albatross declined to near extinction, primarily as a result of hunting at breeding colonies in Japan. Albatross were killed for their feathers and various other body parts. The feathers were used for writing quills, their bodies were processed for fertilizer, their fat was rendered, and their eggs were collected for food (Austin 1949). Hattori (in Austin 1949) commented that short-tailed albatrosses were "...killed by striking them on the head with a club, and it is not difficult for a man to kill between 100 and 200 birds daily." He also noted that the birds were "very rich in fat, each bird yielding over a pint."

Pre-exploration worldwide population estimates of short-tailed albatrosses are not known; the total number of birds harvested may provide the best estimate, as the harvest drove the species nearly to extinction. Between approximately 1885 and 1903, an estimated 5 million short-tailed albatrosses were harvested from the breeding colony on Torishima (Yamashina in Austin 1949), and harvest continued until the early 1930s, except for a few years following the 1903 volcanic eruption. One of the residents on the island, a schoolteacher, reported 3,000 albatrosses killed in December 1932 and January 1933. Yamashina (in Austin 1949) stated that "[t]his last great slaughter was undoubtedly perpetrated by the inhabitants in anticipation of the island's soon becoming a bird sanctuary." By 1949, there were no short-tailed albatrosses breeding at any of the historically known breeding sites, including Torishima, and the species was thought to be extinct (Austin 1949).

In 1950, the chief of the weather station at Torishima, M. Yamamoto, reported nesting of the short-tailed albatross (Tickell 1973, 1975), and by 1954 there were 25 birds and at least 6 breeding pairs present on Torishima (Ono 1955). These were presumably juvenile birds that had been wandering the northern Pacific during the final several years of slaughter. Since then, as a result of habitat management projects, stringent protection, and the absence of any significant volcanic eruption events, the population has gradually increased. The average growth of the Tsubame-zaki colony on Torishima Island between 1950 and 1977 was 2.5 adults per year; between 1978 and 1991 the average population growth was 11 adults per year. An average annual population growth of at least 6 percent per year (Hasegawa 1982; Cochrane and Starfield 1999) has resulted in a continuing increase in the breeding population to an estimated total of

494 breeding pairs in 2004 (total for the species; P. Sievert, pers. comm., 2004). Torishima Island is under Japanese government ownership and management and is managed for the conservation of wildlife. There is no evidence that the breeding population on Torishima is nest site-limited at this point; therefore, ongoing management efforts focus on maintaining high rates of breeding success.

Two management projects have been undertaken to enhance breeding success on Torishima. First, erosion control efforts at the main colony have improved nesting success. Second, there are continuing attempts to establish a second breeding colony on Torishima by luring breeding birds to the opposite side of the island from the Tsubame-zaki colony through the use of decoys and recorded colony sounds. This site is relatively level, well vegetated, and less likely to be affected by lava or mud flows or erosion than Tsubame-zaki. Preliminary results of this experiment are promising; the single pair nesting in the decoy colony have fledged a chick each year since 1997. Although no new pairs have yet established nest sites in the decoy colony, an average of 10 birds has been observed in the decoy colony each evening during the breeding season (H. Hasegawa, pers. comm., 2002). The expectation is that, absent a volcanic eruption or some other catastrophic event, the population on Torishima will continue to grow, and it will be many years before the breeding sites are limited (Service 1999).

In 1971, 12 adult short-tailed albatrosses were discovered on Minami-kojima in the Senkaku Islands, one of the former breeding colony sites (Hasegawa 1984). Aerial surveys in 1979 and 1980 resulted in observations of between 16 and 35 adults. In April 1988, the first confirmed chicks on Minami-kojima were observed, and in March 1991, 10 chicks were observed. In 1991, the estimate for the population on Minami-kojima was 75 birds, including 15 breeding pairs (Hasegawa 1991).

Incidental observations at sea since the 1940s have indicated that in summer (*i.e.*, non-breeding season), short-tailed albatross appear to disperse widely throughout its historical range of the temperate and subarctic north Pacific Ocean (Sanger 1972; Service unpublished data), with observations concentrated in the northern Gulf of Alaska, Aleutian Islands, and Bering Sea (McDermond and Morgan 1993; Sherburne 1993; Service unpublished data). Individuals have been recorded along the west coast of North America as far south as the Baja Peninsula, Mexico (Palmer 1962). Satellite tracking of short-tailed albatross took place in 1996-1998 and 2001-2003. In all but one year, transmitters were affixed to birds in the Torishima colony, and the birds were tracked for a maximum of four months immediately following the breeding season. These birds all eventually moved north from Japan. In an effort to learn more about the short-tailed albatross's movements later in the year, four short-tailed albatrosses were captured at sea in August, 2003, and fitted with satellite transmitters. A summary map of short-tailed albatross satellite-tracking efforts in 2002 and 2003 indicate a wide distribution throughout the North Pacific (Fig. 5).

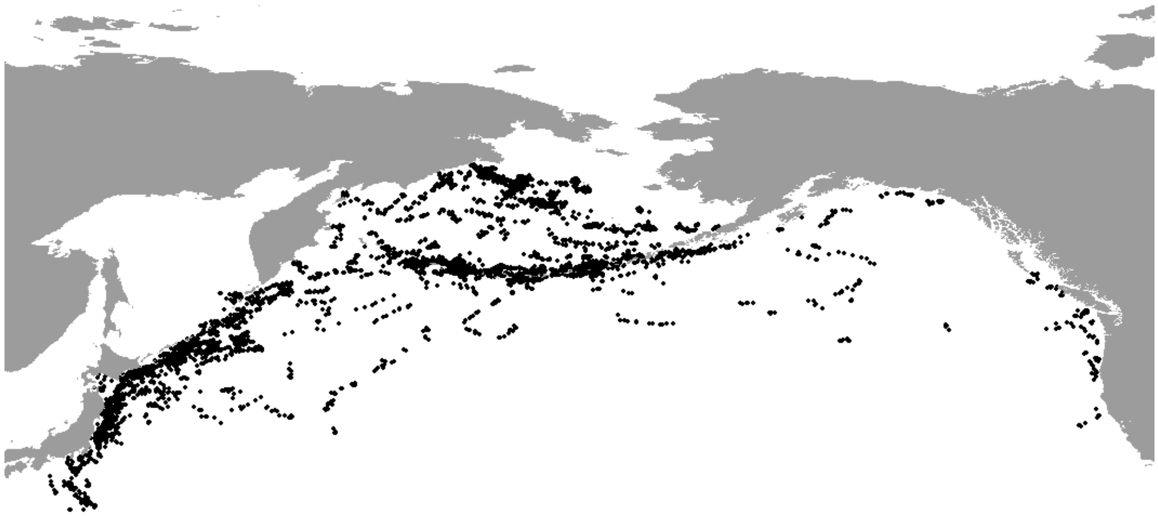


Figure 5. Summary map of the movements of 14 short-tailed albatrosses fitted with satellite transmitters in 2002 and 2003. Three of the tracked birds were captured and fitted with transmitters at sea in the western Aleutian Islands; the remaining 11 birds were captured on Torishima Island. Source: R. Suryan, pers. comm., 2004.

Short-tailed albatrosses have been observed on Midway Atoll since the early 1930s (Berger 1972, Hadden 1941, Fisher in Tickell 1973, Robbins in Hasegawa and DeGange 1982). There is one unconfirmed report of a short-tailed albatross breeding on Midway in the 1960s (Service 1999), but we have no subsequent reports of successful breeding. In the years following the reported observation, tens of thousands of albatrosses were exterminated from Midway Atoll to construct an aircraft runway for the Department of the Navy, and to provide safe conditions for aircraft landings and departures. It is possible that short-tailed albatrosses on the island could have been killed during this process (Service 1999). Since the mid-1970s, approximately thirty-five sightings of short-tailed albatrosses have occurred during the breeding season on Midway Atoll. In March 1994, a courtship dance was observed between two short-tailed albatrosses (Richardson 1994), and one lone female bird occupied a nest site and laid an egg in 1993, 1995, and 1997, none of which hatched (Service 1999). An encounter and some courtship behavior was observed by Service biologists between two short-tailed albatrosses (band numbers 015 yellow and 057 blue) on Sand islet, Midway Atoll, in November, 1999 (R. Shallenberger, Service, pers. comm., 2004). The U.S. Government transferred Midway Atoll from the Navy to the Department of the Interior in 1996, and has designated the Service as the conservation agency to manage Midway Atoll National Wildlife Refuge.

Observations of short-tailed albatross have also been made during the breeding season on Laysan Island, Green Island at Kure Atoll, French Frigate Shoals, and Pearl and Hermes Reef, but there is no indication that these occurrences represent breeding attempts (Sekora 1977, Fefer 1989, Chris Depkin, Service, pers. comm., 2004). Between 1976 and 1994, approximately seven different short-tailed albatrosses have been sighted from these islands. It is possible that short-tailed albatross could have occurred at these locations during the latter part of the 19th century and first part of the 20th century. If so, they would have been vulnerable to Japanese egg and feather collectors as thousands of black-footed and Laysan albatross were killed to support this trade during this period. In 1909, the Hawaiian Islands Bird Reservation was established by President Theodore Roosevelt (Executive Order 1019) to protect birds and their habitat, among other things.

Protection Status of the Species

Between the 1950s and 1970, there were few records of the species away from the breeding grounds (Tramontano 1970). In the North Pacific, there were 12 reported marine sightings in the 1970s, 55 sightings in the 1980s, and over 250 sightings reported in the 1990s to date (Sanger 1972; Hasegawa and DeGange 1982; Service unpublished data). This observed increase in opportunistic sightings should be interpreted cautiously, however, because of the potential temporal, spatial, and numerical biases introduced by opportunistic shipboard observations. Observation effort, total number of vessels present, and location of vessels may have affected the number of observations independent of an increase in total numbers of birds present.

The short-tailed albatross is not on the State of Hawaii's list of threatened and endangered species. However, the short-tailed albatross is considered endangered by the State of Alaska (Alaska Statutes, Article 4, Sec.16.20.19). The Japanese government designated the short-tailed albatross as a protected species in 1958, as a Special National Monument in 1962 (Hasegawa and DeGange 1982), and as a Special Bird for Protection in 1972 (King 1981). Torishima was declared a National Monument in 1965 (King 1981). These designations have resulted in tight restrictions on human activities and disturbance on Torishima (Service 1999). In 1992, the species was classified as "endangered" under the then-newly implemented "Species Preservation Act" in Japan, which makes Federal funds available for conservation programs and requires that a 10-year plan be in place, which sets forth conservation goals for the species. The current Japanese "Short-tailed Albatross Conservation and Management Master Plan" outlines general goals for continuing management and monitoring of the species, and future conservation needs (Environment Agency 1996). The principal management practices used on Torishima are legal protection, habitat enhancement, and population monitoring.

Prior to its current listing as endangered throughout its range, the short-tailed albatross was listed as endangered under the Act, throughout its range, except in the U.S. During this period, the Service considered the short-tailed albatross to be afforded protection under the Act in all portions of its range farther than 3 nautical miles (5.6 km) from U.S. shores, and included those waters of the EEZ (3-200 mi [5.6-370 km] from shore).

The exclusion of the U.S. from the range in which the species was listed resulted from an oversight in administrative procedures, rather than from any biological evaluation of the species' status within the U.S. The species was originally listed as endangered in accordance with the Endangered Species Conservation Act of 1969 (ESCA). Pursuant to the ESCA, two separate lists of endangered wildlife were maintained, one for foreign species and one for species native to the United States. The short-tailed albatross appeared only on the List of Endangered Foreign Wildlife (35 Federal Register [FR] 8495; June 2, 1970). When the current Act became effective on December 28, 1973, it superseded the ESCA. The native and foreign lists were combined to create one list of endangered and threatened species (38 FR 1171; January 4, 1974). When the lists were combined, prior notice of the action was not given to the governors of the affected States (Alaska, California, Hawaii, Oregon and Washington) as required by the Act, because available data were interpreted as not supporting resident status for the species. Thus, native individuals of this species were not formally proposed for listing pursuant to the criteria and procedures of the Act.

On July 25, 1979, the Service published a notice (44 FR 43705) stating that, through an oversight in the listing of the short-tailed albatross and six other endangered species, individuals occurring in the U.S. were not protected by the Act. The notice stated that it was always the intent of the Service that all populations and individuals of the seven species should be listed as endangered wherever they occurred. Therefore, the notice stated that the Service intended to take action as quickly as possible to propose endangered status for individuals occurring in the U.S.

On July 25, 1980, the Service published a proposed rule (45 FR 49844; July 25, 1980) to list, in the U.S., the short-tailed albatross and four of the other species referenced above. No final action was taken on the July 25, 1980, proposal. The Service designated the species as a candidate for listing in the U.S. (62 FR 49398; September 19, 1997). The Service published a proposal to list the short-tailed albatross as endangered in the U.S. (63 FR 58692) on November 2, 1998. A final rule was published on July 31, 2000 (65 FR 46643), listing the species as endangered throughout its range.

E. Threats

Volcanism

Short-tailed albatross face a significant threat at the primary breeding colony on Torishima, where an active volcano poses a constant threat of habitat destruction. The timing and magnitude of this threat are not predictable. Eruptions could be catastrophic or minor, and could occur at any time of year. A catastrophic eruption during the breeding season could result in chick and adult mortalities as well as destruction of nesting habitat. Significant loss of currently occupied breeding habitat or breeding adults at Torishima would delay and possibly preclude recovery of the species.

Torishima is an active volcano approximately 1,182 ft (394 m) high and 1.5 mi (3 km) wide (Service 1999) located at 30.48EN and 140.32EE (Simkin and Siebert 1994). The earliest record of a volcanic eruption at Torishima is a report of a submarine eruption in 1871 (Simkin and Siebert 1994), but there is no information on the magnitude or effects of this eruption. Since the first recorded human occupation on the island in 1887, there have been four formally recorded eruption events: 1) on August 7, 1902, an explosive eruption in the central and flank vents resulted in lava flow and a submarine eruption, and caused 125 human mortalities; 2) on August

17, 1939, an explosive eruption in the central vent resulted in lava flow, and caused two human mortalities; 3) on November 13, 1965, a submarine eruption and; 4) on October 2, 1975, a submarine eruption 4.4 nautical miles (9 km) south of Torishima (Simkin and Siebert 1994). There is also reference in the literature to an additional eruption in 1940 which resulted in lava flow that filled the island's only anchorage (Austin 1949).

Austin (1949) visited the waters around Torishima in 1949 and made the following observations: "The only part of Torishima not affected by the recent volcanic activity is the steep northwest slopes where the low buildings occupied by the weather station staff are huddled. Elsewhere, except on the forbidding vertical cliffs, the entire surface of the island is now covered with stark, lifeless, black-gray lava. Where the flow thins out on the northwest slopes, a few dead, white sticks are mute remnants of the brush growth that formerly covered the island. Also on these slopes some sparse grassy vegetation is visible, but there is no sign of those thick reeds, or 'makusa' which formerly sheltered the albatross colonies. The main crater is still smoking and fumes issue from cracks and fissures all over the summit of the island."

In 1965, meteorological staff stationed on the island were evacuated on an emergency basis due to a high level of seismic activity; although no eruption followed, the island has since been considered too dangerous for permanent human occupation (Tickell 1973). In late 1997, Hasegawa observed more steam from the volcano crater, a more pronounced bulge in the center of the crater, and more sulphur crusts around the crater than were previously present (Service 1999).

The eruptions in 1902 and 1939 destroyed much of the original breeding colony sites. The remaining sites used by albatrosses are on sparsely vegetated steep slopes of loose volcanic soil. The monsoon rains that occur on the island result in frequent mud slides and erosion of these soils, which can result in habitat loss and chick mortality. A typhoon in 1995 occurred just before the breeding season and destroyed most of the vegetation at the Tsubame-zaki colony. Without the protection provided by vegetation, eggs and chicks were at greater risk of mortality from monsoon rains, sand storms and wind (H. Hasegawa, pers. comm., 1997). Breeding success at the Tsubame-zaki colony site is lower in years when there are significant typhoons resulting in mud slides (Service 1999).

Torishima erupted during August and September 2002, and high numbers of earthquakes could be felt in February 2003. The albatrosses' breeding season was over when the eruption took place, however, and although ash is reported to have fallen on the colony site, the ultimate effects of this eruption on the colony site and the short-tailed albatross appear so far to be minimal (R. Suryan, Oregon State University, pers. comm., 2004). A potential result of ash fall from eruptions on the area of the colony is an increase in the fill rate of channels installed for erosion control (E. Flint, pers. comm., 2004).

In 1981, a project was supported by the Environment Agency of Japan and the Tokyo Metropolitan Government to improve nesting habitat by transplanting grass and stabilizing the loose volcanic soils (Hasegawa 1991). Breeding success at the Tsubame-zaki colony has increased following habitat enhancement (Service 1999). Current population enhancement efforts in Japan are concentrated on attracting breeding birds to an alternative, well-vegetated colony site on Torishima which is less likely to be affected by lava flow, mud slides, or erosion than the Tsubame-zaki colony site (Service 1999). Japan's "Short-tailed Albatross Conservation and Management Master Plan" (Environment Agency 1996) identifies a possible long-term goal of establishing additional breeding grounds away from Torishima once there are at least 1,000 birds on Torishima. The Service's Short-tailed Albatross Recovery Team, which includes both American and Japanese members, currently is drafting a recovery plan for the species. This plan will develop and prioritize a range of tasks including habitat enhancement, establishment of new colonies on other islands, and continued research on the ecology of the short-tailed albatross, fishery interactions, and ways to mitigate threats to the species' existence.

It should be noted that the risk of extinction caused by a catastrophic event at the breeding colony is buffered by behavior of adult and immature non-breeding birds. An average of 25 percent of breeding age adults do not return to breed each year (Service 1999), and immature birds do not return to the colony to breed until at least 6 years after fledging (Service 1999). As much as 50 percent of the current total worldwide population may be immature birds. If suitable habitat were still available on Torishima, these birds could recolonize in years following a catastrophic event.

<u>Diseases and Parasites</u>

We know of no diseases affecting short-tailed albatrosses on Torishima or Minami-kojima today. However, the world population is vulnerable to the effects of disease because of the small population size, the extremely limited number of breeding sites, and the genetic consequences of going through a severe population bottleneck within the last century. Hasegawa (pers. comm., 2002) reports that he has observed a wing-disabled bird every few years on Torishima, but the cause of the disability is not known.

Historically, several parasites were documented on short-tailed albatrosses on Torishima: a blood-sucking tick that attacks its host's feet, a feather louse, and a carnivorous beetle (Austin 1949). Ushijima *et al.* (2003) report collecting a tick (*Carios capensis*) from black-footed albatrosses nesting on Torishima. To date, however, we have no evidence to suggest that parasites have caused mortality or had population-level effects.

<u>Predation</u>

Sharks may take fledgling short-tailed albatrosses as they desert the colony and take to the surrounding waters (Harrison 1979). Shark predation of fledglings is well-documented among other albatross species, but has not been documented for short-tailed albatross. A species of crow, *Corvus* sp., is the only historically known avian predator of chicks on Torishima. Hattori (in Austin 1949) reported that one-third of the chicks on Torishima were killed by crows, but crows are not present on the island today (Service 1999). A record from the 1960s describes a short-tailed albatross chick taken by a Steller's sea eagle (*Haliaeetus pelagicus*). In recent years, these sea eagles have been seen taking an occasional black-footed albatross chick on Torishima, but are not believed to be a major threat to the short-tailed albatross (H. Hasegawa, pers. comm., 2002).

Black, or ship, rats (*Rattus rattus*) were introduced to Torishima at some point during human occupation. The effect of these rats on short-tailed albatross is unknown, but rats are known to prey on chicks and eggs of other seabird species (Atkinson 1985), and numerous rat eradication efforts have been undertaken to protect seabird colonies (Taylor *et al.* 2000, Service 2003). Cats (*Felis cattus*) were also present on Torishima, and were most likely introduced during the feather-hunting period. Cats have caused damage to other seabirds on the island (Ono 1955), and to seabirds elsewhere (*e.g.*, Moors and Atkinson 1984, Rauzon 1985, Smith *et al.* 2003), but there is no evidence of feral cat predation on short-tailed albatrosses. Cats were present on Torishima in 1973 (Tickell 1975), but Hasegawa (1982) did not find any evidence of cats on the island in 1979-1981.

<u>Contaminants</u>

Oil development has been considered in the past in the vicinity of the Senkaku Islands (Hasegawa 1981, *in litt.*). This industrial development would introduce the risk of local marine contamination, or pollution due to blow-outs, spills, and leaks related to oil extraction, transfer and transportation. Historically, short-tailed albatrosses rafted together in the waters around Torishima (Austin 1949) and small groups of individuals have occasionally been observed at sea (Service, unpublished data). An oil spill in an area where individuals are rafting could affect the population significantly.

<u>North Pacific Commerical Fisheries</u>

Commercial longline activities pose a serious threat to the short-tailed albatross throughout the species' range. U.S.-based demersal (deep sea) groundfish fisheries in Alaska are monitored by fishery observers who collect data on seabird bycatch. Reports of seabird bycatch are also occasionally received directly from fishermen. Two fishery-related mortalities of short-tailed albatross were reported in the 1980s (Table 4). The first bird, a recently fledged juvenile, was found dead in a fish net north of St. Matthew Island in July 1983. The second bird, also a fledgling, was taken by a vessel fishing for halibut in the Gulf of Alaska on October 1, 1987. In 1989, NOAA Fisheries began consulting with the Service on the effects of Alaska's groundfish fisheries on short-tailed albatrosses. Since 1990, there have been five reported takes of short-tailed albatrosses in Alaska's fisheries. A subadult (< 2 years) was taken south of the Krenitizin Islands in the hook-and-line fishery on August 28, 1995. A subadult (3 years) was taken in the Bering Sea Aleutian Islands (BSAI) hook-and-line fishery on October 8, 1995. A subadult (5 years) was taken in the Pacific Cod hook-and-line fishery on September 27, 1996. An adult (8 years) was taken in the BSAI Pacific cod hook-and-line fishery on September 21, 1998. A subadult bird of unknown age was taken in the BSAI Pacific cod hook-and-line fishery on September 28, 1998. Additional mortalities of unidentified albatrosses also have been reported.

Seven short-tailed albatross mortalities have been reported in Alaska-based fisheries since 1983 (Table 4). Three of these mortalities were reported since 1993, when fishery observers began reporting bird mortalities by species, during observed portions of the haulback. Because these reported mortalities represent only the observed portion of fishery operations, the total take in Alaska-based fisheries was estimated based on the observed takes of short-tailed albatrosses and the rate of observer coverage. This calculation resulted in a total estimated mortality of two short-tailed albatrosses per year in the Alaska-based hook-and-line groundfish fishery (Service 2003a). The current incidental take anticipated and authorized is four short-tailed albatross over two years in the Alaska-based hook-and-line groundfish fishery, and two additional short-tailed albatrosses in the Alaska-based trawl fishery in the period until a new biological opinion is issued (Service 2003b).

Table 4. Reported take of short-tailed albatross by Alaska-based fisheries.

Date	Location Description	Lat/Long	Fishery	Date Banded as Chick	Age at Take	Band(s) No. and Color
July 1983	300 mi north of St. Matthew Island	between 60N,180 and 58.5N, 175W	in net of vessel fishing for brown crab	20 March 1983	juvenile (4 months)	130-01562 orange 039
1 Oct. 1987	GOA	5927.7N, and 145 53.3W	halibut	5 April 1987	juvenile (6 months)	130-01836 red 173
28 Aug. 1995	South of Krenitizin Islands	53.31N, 165.38W	hook-and-line	16 April 1994	subadult (16 months)	13A0853 green 131
8 Oct. 1995	Bering Seas Aleutian Island (BSAI)	57.01 N, 170.39W	hook-and-line	21 April 1992	subadult (3 years)	---?? black 063
27 Sept. 1996	BSAI	5841.3N, 177 02.6W	hook-and-line	15 April 1991	subadult (5 yrs)	13A0518 green 057
21 Sept. 1998	BSAI	57.30 N, 173.57W	Pacific cod hook-and-line	18 April 1990	adult (8 years)	130-04189 brown 087
28 Sept. 1998	BSAI	58.27N, 175.16 W	Pacific cod hook-and-line	unknown	subadult	not known

Except for the 2nd take in 1998, leg bands were recovered from all of the above albatrosses allowing scientists to verify identification and age.

Until recently NOAA Fisheries' ability to monitor potential take of the short-tailed albatross in the Alaska-based trawl fishery has been limited to information collected incidentally by observers and researchers. These incidental observations are what brought to the agencies' attention the potential for short-tailed albatross take associated with the trawl fishery, thus supporting the need for first informal, and then formal consultation on this fishery. Data obtained from an electronic monitoring feasibility study in 2002 suggest that such remote monitoring may be a viable method for observing seabird deterrent use on trawl fishing vessels, and for observing seabird activity and interactions with trawl vessel third-wires (McElderry et al. 2004).

At its December 2001 meeting, the North Pacific Fisheries Management Council unanimously approved recommended changed to the existing regulations for seabird avoidance measures required in the groundfish and halibut fisheries off Alaska. Recommended changes were based on research results from Melvin *et al.* (2001), with modifications considered necessary to accommodate vessel length, vessel type, gear type, and area fished. These recommendations were formalized in a proposed rule published by NOAA Fisheries in 2003 (68 FR 6386).

In addition to U.S.-based fisheries, longline fishing is conducted in the Pacific by vessels from China, Japan, the Republic of Korea, Russia, and Taiwan. These distant water fleets traverse the waters of the North Pacific Ocean in search of swordfish and tuna. In 1997, most catches of swordfish by distant water longline fleets was between 20EN and 40EN, and 140EE and 175EE (WPRFMC 1999) (Appendix A-1). The greatest concentration of tuna catches by distant water longline fleets appeared north and east of the Hawaiian archipelago, west and north of Wake Atoll, and along the equator between 140EE and 135EW (WPRFMC 1999) (Appendix A-2). In 1995, swordfish catches by Japanese longline vessels were about 10,120 metric tons and were caught by vessels operating in the western, central, eastern and southern Pacific (Appendix A-3) (Dinardo 1999). From 1992 - 1994, swordfish catch by coastal longline vessels ranged between 1,181 and 1,394 metric tons (Dinardo 1999).

Recent fishing effort for bigeye tuna by Japanese longline vessels appears to have declined in the western Pacific from 150,761,600 hooks set in 1995 to about 144,444,800 hooks set in 1996. Fishing effort in the eastern Pacific appears to have stabilized at about 125,000,000 hooks set in 1995 and 1996. Overall fishing effort has decreased from 360,522,000 total hooks set in 1980 to about 269,444,800 hooks set in 1996 (Hampton *et al.*1998) (Appendix A-4).

Clearly, the Japanese longline fishing fleet represents a tremendous amount of fishing effort that in many instances overlaps with the currently known range of the short-tailed albatross (Fig. 6). Understanding foreign distant water fishing fleet effort is an integral part of analyzing the threat of foreign longline fishing activities to short-tailed albatross. However, in many fisheries, fishers may not be required to report seabird bycatch, may not be able to identify seabirds, or may face significant disincentives to do. To our knowledge, reporting seabird bycatch and the rates at which seabirds are caught is not reported by the foreign fishing nations mentioned in this section.

Hasegawa (pers. comm., 2002) reported that three or four short-tailed albatrosses come ashore each year on Torishima Island entangled in fishing gear or having swallowed a hook, and he posited that some of these birds may have died later as a result. He also stated that some take by Japanese handliners may occur near the nesting colonies, although no such take has been reported. There is no additional information on the potential effects of fisheries near Torishima on the species.

III. Environmental Baseline

The environmental baseline describes the status of the species and factors affecting the environment of the species or critical habitat in the proposed action area contemporaneous with this formal consultation. The baseline usually includes State, local, and private actions that affect a species at the time the consultation begins. Unrelated Federal actions that have already undergone formal or informal consultation are also a part of the environmental baseline. Federal actions within the action area that may benefit listed species or critical habitat are also included in the environmental baseline.

A. Status of the Species Within the Action Area

The action area for this consultation is where Hawaii-based longline fishery conducts shallow-set longline operations and overlaps with the range of the short-tailed albatross (Figs. 6 and 7). Based on the sighting record, an unknown number of short-tailed albatross traverse the waters near the Hawaiian archipelago, including the U.S. EEZ around Hawaii and international waters, where encounters with longline fishing vessels may occur. Therefore, the effects of the action can occur in the area where the Hawaii-based longline fishery overlaps with the range of the species. The environmental baseline for this consultation includes the status of the species as a whole, as described above, including the current known natural and anthropogenic threats to the species.

B. Factors Affecting Species' Environment Within the Action Area

<u>Breeding Habitat</u>

Midway Atoll has been identified as a possible site for establishing an additional breeding colony (Service 1999). Midway Atoll National Wildlife Refuge is a logical candidate because it is visited by short-tailed albatross that have displayed reproductive capacity (*e.g.*, courtship dances and egg-laying). Furthermore, Midway Atoll is under the authority and control of the U.S. Federal government (Service) and our ability to regulate activities conducted on the atoll could

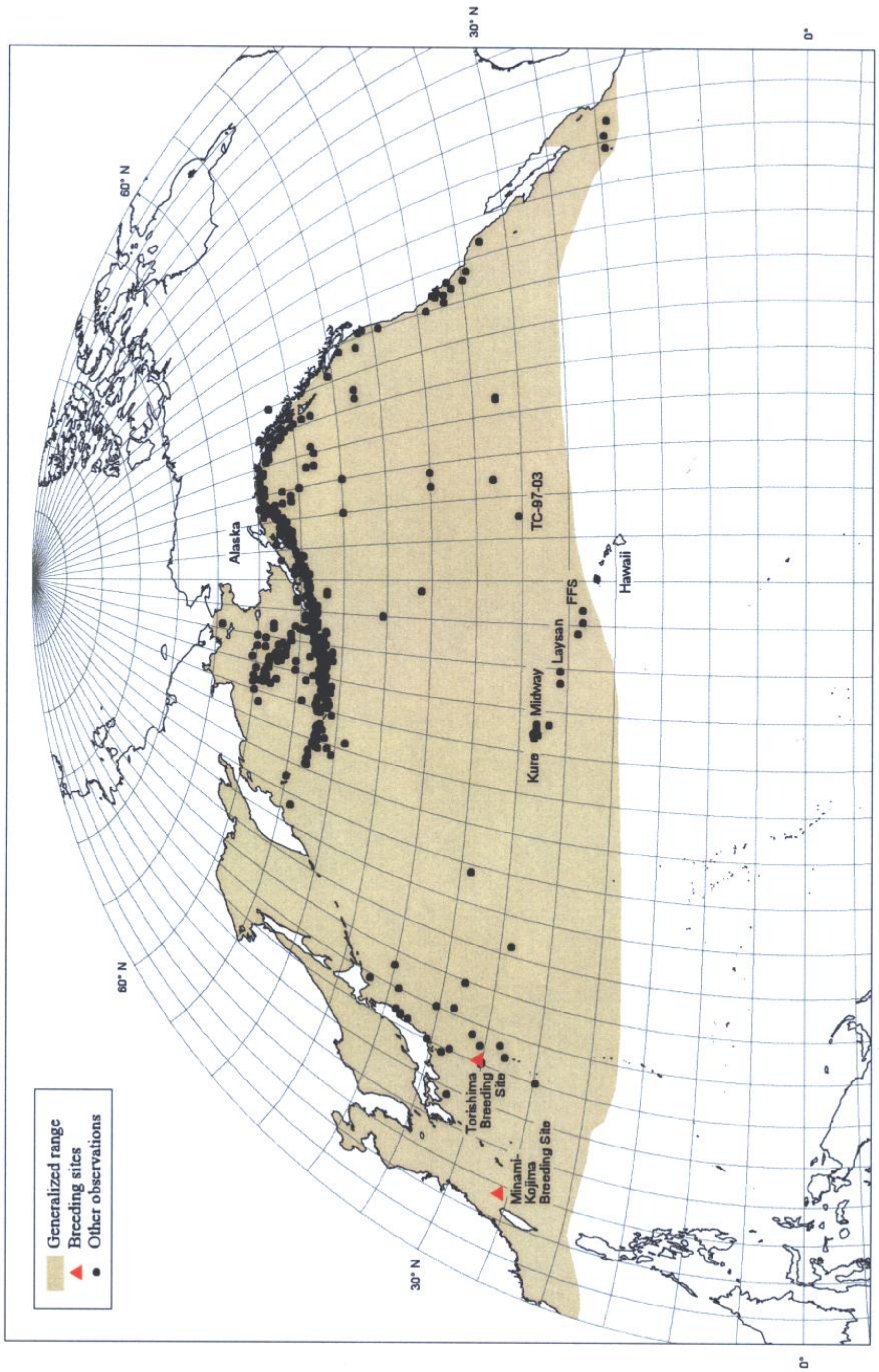


Figure 6. Observations, breeding sites, and generalized range of the short-tailed albatross**.**

promote expansion of the short-tailed albatross population. The decoy colony at Midway is maintained with regular refurbishment of the decoys and audio play-back system (J. Klavitter, pers. comm., 2004). Until other safe breeding sites are established, short-tailed albatross survival will continue to be at risk due to the possibility of significant habitat loss and mortality from unpredictable natural catastrophic volcanic eruptions and land or mud slides caused by monsoon rains.

Contaminants

Oil contamination can harm short-tailed albatrosses through either direct toxicity or interference with the bird's ability to thermoregulate. Oil spills can occur in many parts of the short-tailed albatross' marine range, including within the action area. The species' habit of feeding at the surface of the sea makes them vulnerable to oil contamination. Hasegawa (pers. comm., 2002) has observed some birds on Torishima with oil spots on their plumage. Oiled breast feathers on incubating adults may lead to embryo mortality. Studies have shown that less than a microliter of oil on a common eider egg will kill the chick (K. Trust, pers. comm., 2003)

Consumption of plastics may also be a factor affecting the species' survival. Albatrosses often consume plastics at sea, presumably mistaking the plastics for food items, or in consuming marine life such as flying fish eggs which are attached to floating objects. Hasegawa (pers. comm. 2002) reports that short-tailed albatrosses on Torishima commonly regurgitate large amounts of plastic debris. Plastics ingestion can result in injury or mortality to albatross if sharp plastic pieces cause internal injuries, or through reduction of ingested food volumes and dehydration (Sievert and Sileo 1993). Young birds may be particularly vulnerable to potential effects of plastic ingestion prior to developing the ability to regurgitate (Fefer 1989, *in litt.*). Auman (1994) found that Laysan albatross chicks found dead in the colony had significantly greater plastic loads than chicks injured by vehicles, a sampling method presumably unrelated to plastic ingestion, and therefore representative of the population. Hasegawa (pers. comm., 2002) observed a large increase in the occurrence of plastics in birds on Torishima between 1992 and 2002, but the effect on survival and population growth is not known.

Pacific Fisheries Based Outside Hawaii

Longline fisheries in the North Pacific Ocean and Bering Sea pose a serious threat to the short-tailed albatross, as described above in the Status of the Species section. Non-U.S. distant water longline fleets may operate within the action area, which includes waters outside the U.S. EEZ. Data on the distribution and effort of distant water longline fleets from outside the U.S. is integral to analyzing the threat posed by foreign fisheries to the short-tailed albatross. Despite significant international initiatives in recent years to address this problem globally, there is still little information available on the magnitude of this threat.

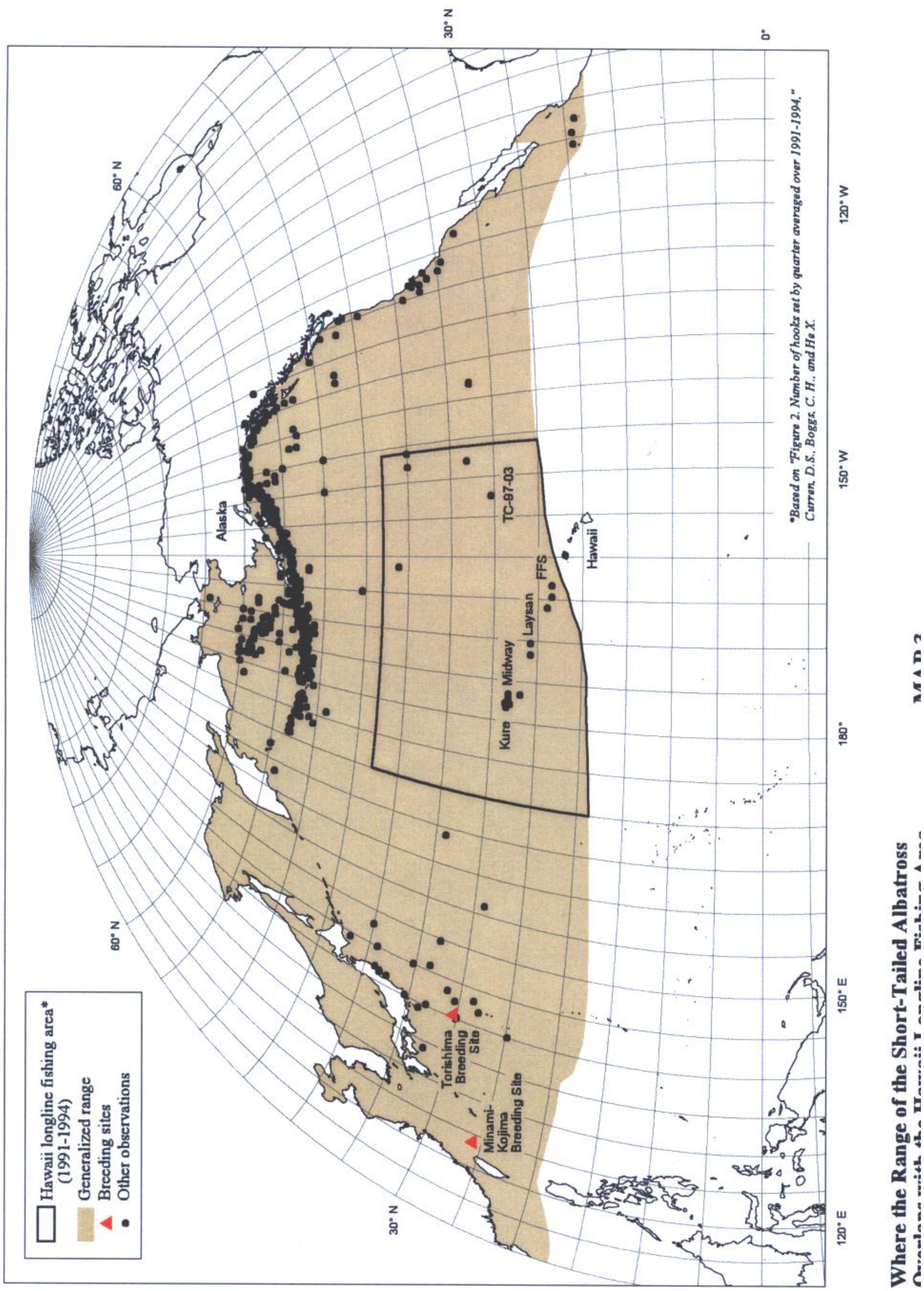


Figure 7. Overlap of the Hawaii-based longline fishery and the range of the short-tailed albatross.

Air Strikes

No collisions of short-tailed albatross with aircraft have been documented at Midway Atoll National Wildlife Refuge. Seabird collisions with airplanes have been documented by the Service on Midway Atoll National Wildlife Refuge since operation of the airfield was transferred from the Department of Defense to the Department of Interior in July 1997. Since the closure of Midway Phoenix Corporation's activities at Midway in 2002, air traffic to Midway is reduced significantly. In May of 2004, Aloha Airlines discontinued charter service to Midway, further reducing the amount and type of air traffic at the refuge. Currently, the only aircraft that serves Midway on a regular basis is a Gulfstream G-1 aircraft operated by Maritime Air, which makes one flight each week on a charter basis (J. Klavitter, pers. comm., 2004). Most flights arrive and depart in darkness during the peak of the albatross nesting season, mid-November to mid-July, to minimize hazards to seabirds. The lighting at the air terminal for these flights may result in the deaths of an estimated one albatross (Laysan or black-footed) and three to four Bonin petrels (from collisions with the terminal building) (J. Klavitter, pers. comm., 2004). The U.S. Coast Guard conducts daytime operations at Midway Atoll roughly once every two months, using C-130 aircraft.

Since acquiring the airfield, the Service has implemented several precautionary mechanisms to reduce and document seabird collisions. Transient aircraft (primarily U.S. military or U.S. Coast Guard C-130s) are required to obtain prior permission from the refuge manager before landing at Midway Atoll National Wildlife Refuge. Aircraft are advised to land within the parameters provided by airfield operations to reduce air collisions with seabirds.

Prior to any aircraft landing or takeoff, the runway and taxiways are "swept" to haze any birds resting on the airfield or upwind of the runway. In most cases, birds are simply escorted or "shooed" about 300 ft (100 m) downwind of the active runway by refuge and Chugach McKinley, Inc. (contractor) staff. Staff also remove birds that occur upwind of the runway because they may fly into the path of the oncoming plane. If these staff encounter "stubborn" adult birds that refuse to be escorted or chicks that have wandered onto the runway, the staff physically remove them to a safe distance downwind of the active runway.

Due to the size of the runway at Midway Atoll National Wildlife Refuge, refuge and contractor staff use vehicles to reach all points of the active runway, taxiways or areas upwind of the runway that are occupied by birds. During nesting seasons, runway sweeps become more involved with several crews removing birds from the runway. Finally, refuge staff provide bird activity advisories to pilots and recommend modified approaches and landings at the airfield to avoid collisions with birds.

The Service has collected information concerning aircraft type and movement and the incidence of bird strikes since the last contingent of Navy personnel left Midway on June 30, 1997. Please see the November 2000 Opinion to review those data for the period from July 1, 1997 to June 1, 2000.

A female short-tailed albatross (band: yellow 015, band lost in 2002) has resided about 150 ft (50 m) from the end of the Midway Atoll National Wildlife Refuge runway since 1989, and she is known to reside on the island during the nesting season, from November to April. Although the bird is located close to the runway, an aircraft is unlikely to collide with her because albatrosses are less likely to fly at night and most landings and takeoffs occur at night during the period this bird resides at Midway. There have been no reports of “yellow 015" having a close encounter with aircraft, according to ground crews at Midway Atoll National Wildlife Refuge (R. Dieli, Service, pers. comm., 2000).

The Service operates a very limited air service to Tern Islet, French Frigate Shoals, to support ongoing conservation and research activities associated with the mission of this refuge. Similar to the procedure at Midway, the Service provides advisories to incoming pilots and conducts pre-landing and takeoff “sweeps” to remove birds from the active runway. During the course of a year, a small number of birds are injured and killed as a result of landing-and takeoff-related activities. Short-tailed albatross have never been observed on or near Tern Islet during airplane landing and takeoff activities. Therefore, the Service does not consider this a threat of injury or mortality to short-tailed albatross.

Other Factors

A small number of Laysan and black-footed albatross are killed at Midway Atoll National Wildlife Refuge due to collisions with ironwood trees, power lines, or buildings and due to entrapment in confined spaces (*e.g.*, seawalls). Collisions therefore are a potential risk for short-tailed albatrosses at Midway, albeit a very small risk. A priority for the refuge is to minimize these hazards, and the staff removes ironwood trees and unnecessary wires and poles (T. Bodeen, pers. comm., 2004). These efforts are reducing the hazard to seabirds, but these hazards are unlikely to be eliminated permanently.

IV. Effects of the Action

The potential exists for take to occur as a result of the proposed changes to the fishery, that is, the limited resumption of swordfish-target longlining. Therefore, in an effort to ensure the long-term survival of the species, NOAA Fisheries formally consulted with the Service under section 7 of the Act on this proposed action and the anticipated take that may occur as a result of interaction with short-tailed albatross. Fishing activities covered under this consultation will occur within the U.S. EEZ and international waters. The effects of the action on this species will potentially occur where the range of the short-tailed albatross, in the North Pacific Ocean, overlaps with the area where the Hawaiian longline fleet conducts fishing operations (Figs. 6 and 7).

Sighting records indicate that short-tailed albatross have been observed in the Northwestern Hawaiian Islands since the 1930s. Although interactions between short-tailed albatross and gear deployed from Hawaii-based longline vessels have not been observed, short-tailed albatrosses have been observed at sea in areas where the Hawaii-based longline fishery historically has fished for swordfish, and where Laysan and black-footed albatross have been reported to be killed by longline fishing gear. The most recent of these sightings took place in January, 2004, from a California-based vessel fishing within the area where the Hawaii-based fishery operates (see below). The short-tailed albatross population is very low compared to historical estimates (current estimate: 1,990 birds [Sievert 2004]; historical estimate: about 5,000,000 birds), and an unknown fraction of the short-tailed albatross population temporarily resides in or passes through the Hawaiian archipelago and areas where the proposed fishing operations will be conducted.

To date, observations of short-tailed albatross and records of the incidental take of short-tailed albatross in fishery operations have been very few, and none of the observations of take have come from the Hawaii-based fishery. This is because very little time has been spent observing seabird interactions with the fishery, historically, and only a few short-tailed albatross have been observed to occur in the vicinity of the fishing grounds. Since 2001 the tuna-target sector of the Hawaii longline fishery has had 20% observer coverage, with observers on at least 5% of the trips north of 23ºN dedicated to documenting seabird behavior and interactions with fishing operations.

NOAA Fisheries began estimating the number of Laysan and black-footed albatross interactions in the Hawaii-based longline fishery in 1994. Several thousand Laysan and black-footed albatross were estimated to be taken each year by fishing gear deployed by the Hawaii-based longline vessels between 1994 and 2000. After this time shallow-set effort decreased sharply and then ceased in 2001 (McCracken 2001, NOAA Fisheries 2003a and unpublished data). Since 2001, albatross mortality in this fishery has decreased.

A. Factors to Be Considered

The probability of short-tailed albatross being taken on longline gear and of the take being reported is a function of many factors, including: (1) temporal and spatial overlap of the distribution of short-tailed albatross at sea and the distribution of longline vessels' fishing operations, (2) albatross foraging behavior, (3) total number of baited hooks set per unit time, and the species targeted by the longline fishing vessels, (4) use and effectiveness of seabird deterrent devices, (5) type of fishing gear used, (6) length of time longline gear is at or near the surface of the water during the set, and to a lesser degree during the haulback, (7) behavior of the individual bird, (8) water and weather conditions (*e.g.*, sea state), (9) availability of food items for birds (including bait and offal), and (10) physical condition of the bird. The number of birds affected by fishing operations is also a function of population size; as the short-tailed albatross population increases, we expect a concomitant increase in fishery interactions and in the number of birds killed. The probability of a hooked short-tailed albatross being reported is a function of (1) observer coverage (100% in the case of vessels targeting swordfish), (2) the prioritization of the observers' duties and the training they receive, and (3) the observation skills and reporting accuracy of these individuals.

Observations of Short-tailed Albatrosses in Hawaii and in the Action Area

Short-tailed albatrosses have been observed in the vicinity of the Northwestern Hawaiian Islands typically between November and April. Since 1938, approximately 50 observations of about 17 different short-tailed albatross have been sighted from or near land (Table 5). Short-tailed albatross have been observed from Midway Atoll (Sand and Eastern Islets), Laysan Island, French Frigate Shoals (Tern Islet), Pearl and Hermes Reef (Southeast Islet), and Kure Atoll (Green Islet). Sightings of short-tailed albatross from land represent the majority of all sightings. The Pacific Ocean Biological Survey Program produced no at-sea observations of short-tailed albatross in the vicinity of the Northwestern Hawaiian Islands, but this survey program was conducted at a time (1960s) when the short-tailed albatross population was very low. Three marine observations of short-tailed albatross have been recorded by NOAA Fisheries employees, including fishery observers, within the area where the Hawaii-based fishery operates. These observations took place in 1997, 2000, and 2004.

Table 5. Short-tailed albatross sightings in the Hawaiian Islands, 1938-2004 (USFWS unpublished data).

Year	Month or Season	Day	Location	No. Birds	Description
1938	Dec.	---	Midway/Sand Is.	1	Immature
1939	Dec.	---	Midway/Sand Is.	1	Injured and died
1940	Nov.	28	Midway/Sand Is.	1	Immature
1965	winter	---	Midway Islands	1	Immature
1966	Mar.	18	Midway/Eastern Is.	1	Immature banded[1]
1972	Nov.	---	Midway/Sand Is.	1	Band 558-30754[2]
1973	May	---	Midway/Sand Is.	1	Band 558-30754
1973-74	fall - winter	---	Midway/Sand Is.	1	Band 558-30754
1974-75	fall - winter	---	Midway/Sand Is.	1	Band 558-30754
1976	Mar.	---	Laysan Is.	1	Immature-unbanded
1976	winter	---	French Frigate Shoals/ Tern Is.	1	Immature-unbanded
1976	winter	---	Midway/Sand Is.	1	Band 558-30754
1977	Dec.	---	Midway/Sand Is.	1	Band 558-30754
1978-79	Oct.-Jan.	---	Midway Is.	1	Band 558-30754
1979-80	Nov.-Jan.	---	Midway/Sand Is.	1	Band 558-30754
1980	Jan.	13	French Frigate Shoals/ Tern Is.	1	Unknown
1980	Dec.	12	Midway/Sand Is.	1	Band 558-30754

Table 5, continued.

Year	Month or Season	Day	Location	No. Birds	Description
1981	Oct.-Dec.	---	Midway/Sand Is.	1	Band 558-30754
1981	Feb.	25	Midway/Sand Is.	1	Immature unbanded
1982	Jan.	25	French Frigate Shoals/ Tern Is.	1	Unknown
1982-83	Nov.-Feb.	---	Midway/Sand Is.	1	Band 558-30754
1984	Dec.	15	Midway/Sand Is.	1	000 white[3]
1985	Nov.	20	Midway/Sand Is.	1	000 white
1987	Feb.-Mar.	---	Midway/Sand Is.	1	000 white
1988	Dec.	2	Midway/Sand Is.	1	000 white
1989	Dec.	8 - 12	Midway/Sand Is.	2	015 yellow[4] and 000 white
1990-91	Fall-Winter	---	Midway/Sand Is.	2	015 yellow and 000 white
1991-92	Dec.-Mar.	---	Midway/Sand Is.	2	015 yellow and 000 white
1992-93	Dec.-Jan.	---	Midway/Sand Is.	2	015 yellow and 000 white
1993-94	Oct.	26	Midway/Sand Is.	2	015 yellow and 000 white
“	Jan.	11	“	“	Sitting on infertile egg
“	Mar.	9	“	“	Seen together for the first time
1994	Feb.-Mar.	9	French Frigate Shoals, Tern Is.	1	047 yellow[5]
1994	Mar.	24	Kure Atoll/ Green Is.	1	043 yellow
1994	Nov.	3	Midway/Sand Is.	2	015 yellow and 000 white
1995			“	1	015 yellow
1995-96	fall-winter	8	Midway/Sand Is.	2	015 yellow incubated infertile egg and 172 black[6]
1995-96	Dec.-Feb.	---	Midway/Eastern Is	1	051 red-orange[7]
1997	Nov.	4	Midway/Sand Is.	1	015 yellow incubated infertile egg
1998-99	Nov.-Feb.	---	Midway/Sand Is.	1	015 yellow
1999	Feb.	5-6	Midway/Eastern Is.	1	057 blue[8]

Table 5, continued.

Year	Month or Season	Day	Location	No. Birds	Description
1999	Nov.	5	Midway/Sand Is.	1	057 blue
1999	Feb.-May	---	Midway/Sand Is.	1	057 blue present intermittently
1999-2000	28 Oct.-20 Nov.		Midway/Sand Is.	1	015 yellow present intermittently
"	27 Nov.-16 Apr.		"	"	"
1999	Oct.	31	Midway/Eastern Is.	1	051 red
"	Nov.	11	"	"	"
"	Dec.	22	"	"	"
1999-2000	27 Dec.-1 Feb.		Midway/Eastern Is.	1	051 red
1999-2000	17 Nov.-26 Jan.		Midway/Sand Is.	1	057 blue present intermittently near NAVFAC
2000	Mar.	28	Kauai/Pacific Missile Range Facility	1	Juvenile resting in grass on mountain side of runway
2000-2001	30 Oct.-17 Apr.		Midway/Eastern Is.	1	051 red
2000-2001	24 Oct.-11 Apr.		Midway/Sand Is.	1	015 yellow present intermittently
2001	Jan.	8-9	Midway/Sand Is.	1	Black 133 lf, 13A-0703 metal rt.[9] South Beach overlook
2001	Mar.	28	Midway/Eastern Is.	1	057 orange SW end of runway
2001-2002	29 Oct.-17 Apr.		Midway/Eastern Is.	1	051 red rt, metal lf, decoy plot
2001-2002	25 Oct.-11 Apr.		Midway/Sand Is.	1	015 yellow incubated infertile egg, color band lost
2002	Feb.	2	French Frigate Shoals/Tern Is.	1	Adult observed flying over the north side of island
2002-2003	11 Nov.-28 Mar.		Midway/Eastern Is.	1	Adult, metal band lf, in decoy plot, nest cup

Table 5, continued.

Year	Month or Season	Day	Location	No. Birds	Description
2002-2003	27 Oct. - 25 Mar.		Midway/Sand Is.	1	Metal band rt, south side of runway, prob. "015 yellow"
2003	Jan.	1-15	Midway/Sand Is.	1	Juvenile (unbanded?) seen on land twice at bulky dump
2003-2004	28 Oct.-3 Apr.		Midway/Eastern Is.	1	Adult, metal band lf: 130-01319? decoy plot, courting decoy
2004	Apr.	22	Pearl and Hermes Reef/Southeast Is.	1	Subadult flying over water within one mile of islet

Sources: Data supplied by R. Pyle, Bishop Museum, Hawaii and Service National Wildlife Refuge reports. 1940-1962: No records available.

[1] Chandler Robbins banded the bird with two USFWS bands (nos. 767-95701 and 767-95702)

[2]Bird was banded as a chick on Torishima 10 March 1964

[3]Bird was first banded as a chick on Torishima, March 1979

[4]Bird was first banded as a chick on Torishima, March 1982

[5] Bird was first banded as a chick on Torishima, April 1989

[6] Bird was first banded as a chick on Torishima, April 1993; bird had all dark plumage.

[7] Bird was first banded as a chick on Torishima, (either April 1987 or 1990).

[8] Bird was first banded as a chick on Torishima, April 1988.

[9] Bird was first banded as a chick on Torishima, August 1993.

A short-tailed albatross (band: yellow 047) was observed for nine days on Tern Island, French Frigate Shoals Atoll, Hawaiian Islands National Wildlife Refuge during the winter of 1994.

A male short-tailed albatross with band “white 000" was banded as a chick at Torishima in 1978. This bird was first recorded at Midway Atoll on 15 December 1984 (Table 5). After that, this returned each year in December and left each spring, usually in April, until its disappearance in the fall of 1994. The bird was almost always seen in the same area on the south side of Sand Islet. The bird’s pattern of behavior in the breeding season was to sit in the colony except for occasional trips of two or three days length out to sea. In March 1994, “white 000" was observed and video-taped dancing with “yellow 015,” a female short-tailed albatross hatched at Torishima in 1983 that had been coming to another part of Sand Islet since 1989. “White 000" returned again in the fall of 1994 but failed to return after a routine foraging trip soon thereafter. There was heavy longline fishing activity and high black-footed and Laysan albatross mortality as measured by the observer program north of Midway Atoll during 1994. The bird has never been sighted again in any of the Northwestern Hawaiian Islands nor at Torishima. This bird was a young adult that over 10 years had consistently occupied a territory at Midway Atoll, and adult short-tailed albatross have no natural at-sea predators while foraging. Therefore, the Service maintains that "white 000" may have been taken in the Hawaiian longline fishery.

On March 28, 1997, a short-tailed albatross was observed during haulback operations by a NOAA Fisheries fishery biologist aboard the NOAA Research Vessel (*R/V*) *Townsend-Cromwell* (Appendix A-5). In the early morning hours, the short-tailed albatross was observed to be flying in a clockwise circle over the baited hooks which were being hauled back at the starboard/stern area of the vessel. The biologist noted that the "short-tail was actively looking for bait on hooks in the haulback." The biologist noted that at least 30 black-footed albatross and one Laysan albatross were also observed flying over baited hooks during haulback operations. The time and position of the vessel during haulback was: haulback began at 8:04am - 30º 28' 070" north latitude and 153º 43' 570" west longitude; haulback ended at 9:21am - 30º 28' 822" north latitude and 153º 37' 952" west longitude. About 150 hooks were deployed during the set.

The biologist was studying the effectiveness of the "tori line," a device to haze seabirds from baited hooks deployed by fishing vessels. However, the tori line was not deployed at the time of the sighting of the short-tailed albatross. During the course of the cruise, the biologist documented the behavior of at least 91 black-footed albatrosses and six Laysan albatrosses during five experimental sets during the period of 24 - 28 March 1997.

This was the first documented sighting of a short-tailed albatross from a vessel in the vicinity of the Hawaiian Islands. This also was the first time staff on a research vessel cruise in the vicinity of the Northwestern Hawaiian Islands included a biologist trained specifically to identify seabirds and record their behavior. In the past, NOAA Corps Officers untrained in seabird identification have recorded opportunistic sightings of seabird species. Since 1989, the *R/V Townsend-Cromwell* has conducted about 21 longline research cruises that typically last about 15 - 30 days each.

On this particular cruise (Cruise TC-97-03 [TC-281], March 20 - April 18, 1997), the *R/V Townsend-Cromwell* operated about 480 to 780 nautical miles (889 to 1445 km) off the island of Oahu, Hawaii. Longline fishing operations were conducted using monofilament longline gear in conjunction with hook timers and time-depth recorders to study the habitat utilization, hooked longevity, and vulnerability to fishing gear of broadbill swordfish (*Xiphias gladius*). During the cruise, the crew of the *R/V Townsend-Cromwell* tagged, released and sampled about 76 fish. The types of fish caught during the cruise included: 26 blue sharks (*Prionace glauca*), 12 broadbill swordfish (*Xiphias gladius*), 20 mahimahi (*Coryphaena hippurus*), 16 longsnout lancetfish (*Alepisaurus borealis*), one albacore tuna (*Thunnus alalunga*), and one snake mackerel (*Gempylus serpens*).

On January 23, 2000, a short-tailed albatross was observed flying near a Hawaii-based longline fishing vessel while hauling back longline gear. The observation was recorded by a NOAA Fisheries fishery observer. The sighting occurred at 8:37 a.m. at 33º9'2" north latitude and 147º49'6" west longitude. The bird was observed flying in a group of about 10 to 15 black-footed albatrosses and was in sight of the longline vessel, circling it for approximately 90 minutes. Although some of the black-footed albatrosses in this group were feeding on discarded bait, the short-tailed albatross was not observed feeding on bait. The observer judged the bird to be a juvenile. It had a large, bright pink bill and completely brown plumage. No seabird mitigation methods were employed at the time of the sighting.

On March 28, 2000, a juvenile short-tailed albatross was observed by Mr. Richard Daley at the Pacific Missile Range Facility (PMRF), Barking Sands, Kauai, Hawaii, at just above 22º north latitude. The bird was observed at 5:30 p.m., and was observed to be resting in the grass on the mountain side of the PMRF runway (R. Daley, in litt. in R. Pyle, Bishop Museum, pers. comm., 2004).

On November 4, 2001, in a meeting to review the protected species workshops held by NOAA Fisheries, NOAA Fisheries staff stated that two or three fishermen said they had seen a short-tailed albatross during longline trips, but whether these fishermen had correctly identified short-tailed albatrosses is not clear (Karla Gore, NOAA Fisheries, pers. comm., 2002).

On February 2, 2002 one adult short-tailed albatross was observed flying over the north side of Tern Island, French Frigate Shoals, by three members of the Hawaiian Islands National Wildlife Refuge staff (Debra Henry, Service, pers. comm. 2002).

On January 26, 2004, a NOAA Fisheries observer aboard a California-based longline vessel targeting swordfish had a sighting of a possible short-tailed albatross at 32º 27' N latitude, 150º 43' W longitude, well within the area where albatross mortality has been documented in association with the Hawaii-based longline fishery. At the time of the sighting, the weather was calm and the vessel was retrieving its longline gear. The albatross was about 30 ft (10 m) from the vessel and gear. No observed interaction occurred. The observer took notes on the bird's appearance and took photographs. On March 22, the identification was confirmed to be a short-tailed albatross by Service personnel in Honolulu (E. Flint and H. Freifeld, pers. comm. 2004).

On April 22, 2004, one subadult short-tailed albatross was observed flying over the water within one mile of Southeast Islet at Pearl and Hermes Reef. A Service biologist made the observation while en route to the islet from the NOAA vessel *Oscar Sette* (C. Depkin, Service, pers. comm., 2004).

Foraging Behavior and Surrogate Species

Short-tailed, black-footed, and Laysan albatrosses range over the entire North Pacific Ocean (Sanger 1974a, 1974b), however, there are regions where albatrosses are more commonly observed. These regions are associated with breeding colonies and highly productive waters of the Bering Sea and Gulf of Alaska, as well as the North Pacific Transition Zone and along the western coast of North America. Black-footed and Laysan albatrosses nesting in the Northwestern Hawaiian Islands forage predominantly north and northeast of the Hawaiian Archipelago, flying as far as Alaska or the western coast of the contiguous U.S. (Fernandez *et al.* 2001, Hyrenbach *et al.* 2002). Differences in distribution at sea might also be explained, in part, by variations in foraging behaviors and preferred prey. It is reasonable to assume that seabirds are migrating to regions of high productivity to forage regardless of their preferred food. These same areas of high productivity also attract longline fishing operations (Seki *et al.* 1999).

Because of the rarity of some endangered species, surrogate species may be used to assess the effect of the proposed action (Service and NOAA Fisheries Endangered Species Consultation Handbook, p. 4-47). Albatrosses are vulnerable in the North Pacific to longline fishing wherever they co-occur. Because Laysan, black-footed, and short-tailed albatrosses exhibit similar feeding behavior at sea and have been documented to be killed in other U.S. fisheries, Laysan and black-footed albatrosses are appropriate surrogates to assess the effects of the proposed action on the endangered short-tailed albatross. The approximate area in which Laysan and black-footed albatross interact with Hawaii-based longline vessels is illustrated in Figure 8, and the area where the Hawaii-based longline fishery overlaps with the range of the short-tailed albatross is illustrated in Figure 7. These maps indicate that interactions between Laysan and black-footed albatross species and the Hawaii-based longline vessels occurs within the range of the short-tailed albatross. These actions have resulted in mortality of Laysan and black-footed albatrosses (See Hooks Set per Unit Time and Trip Type section, below).

Similar to Laysan and black-footed albatross, short-tailed albatross are able to locate food using well-developed eyesight and sense of smell. All three species of albatross feed at the ocean surface or within the upper 3 ft (1 m) by seizing, dipping or scavenging (Austin 1949, Harrison *et al.* 1983). Their diet consists primarily of squid, fish, flying fish eggs, shrimp, and other crustaceans (Hattori in Austin 1949, H. Hasegawa, pers. comm., 1997).

As demonstrated in the Alaska fishery, short-tailed, Laysan and black-footed albatross have been documented by NOAA Fisheries to be killed as a result of interaction with demersal longline gear (Shannon Fitzgerald, NOAA Fisheries, pers. comm. 2000). Birds attempting to steal bait may be hooked, pulled underwater as the mainline is set at its fishing depth, and drowned. In a similar manner, birds may also be killed during haulback operations. Also, if birds that attempt to steal bait are not hooked, they may be injured during the process of attempting to steal bait either from the hook, branch line, or mainline.

In February 1999, fishery scientists aboard the *R/V Townsend-Cromwell* conducted a study to test the effectiveness of several techniques to reduce seabird interaction with swordfish longline fishing gear. A portion of the experiment was conducted within 50 nautical miles (nm) (91.45 km) of French Frigate Shoals, a breeding colony for black-footed and Laysan albatross and where at least two different short-tailed albatross have been observed. The experiment was also conducted in close proximity to Laysan Island where Laysan and black-footed albatross occur. Normally, longline fishing vessels are prohibited from entering waters closer than 50 nautical miles (91.45 km) from the islands and atolls that comprise the Northwestern Hawaiian Islands to avoid interaction with marine mammals. However the risk to seabirds and other protected species was considered negligible, because this was an experiment to test the effectiveness of certain seabird deterrent devices. Also, large safety pins were substituted for hooks to hold the

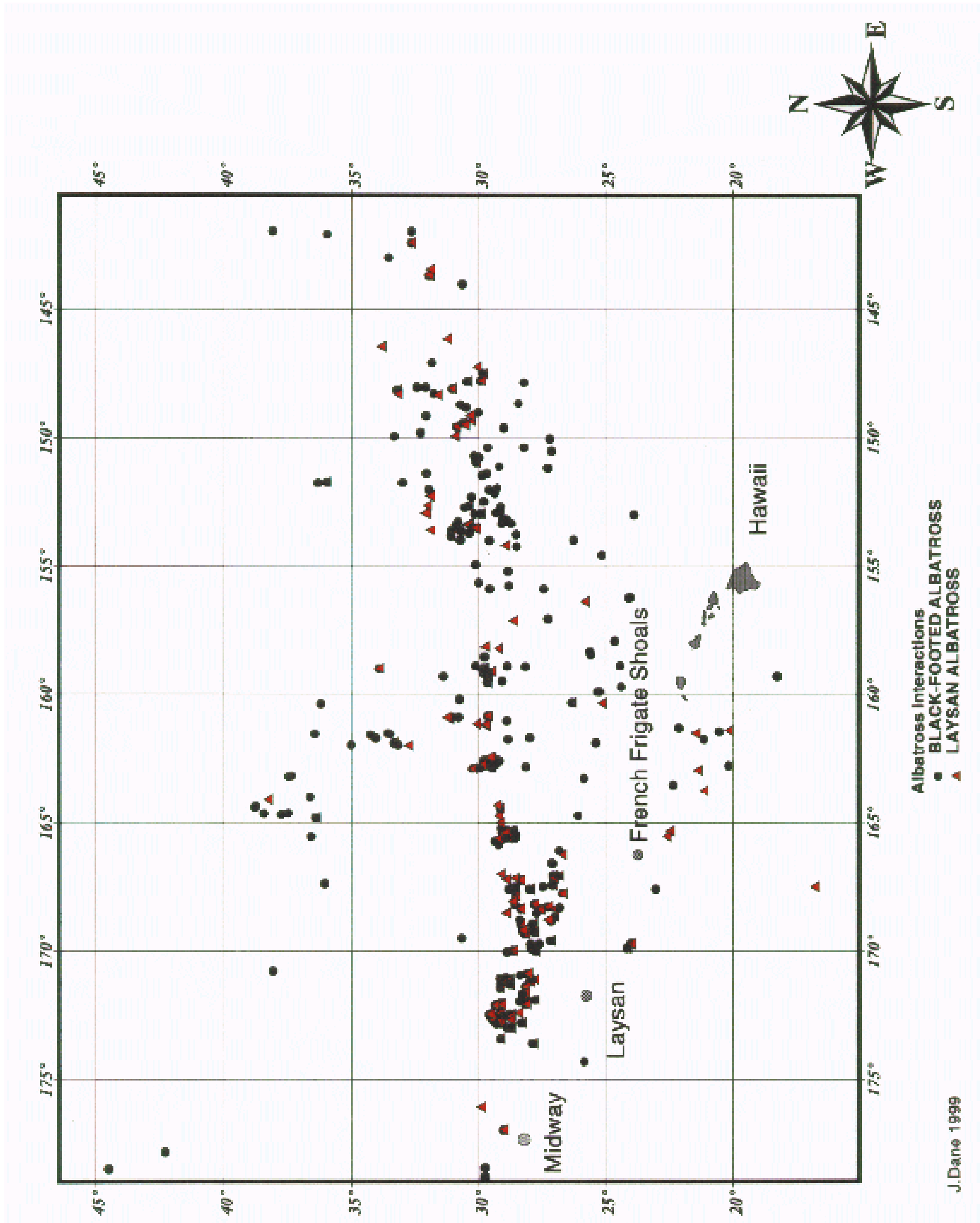


Figure 8. General distribution of albatross interactions with the Hawaii-based longline fishery (NOAA Fisheries unpublished data 1999).

bait (squid - *Illex* spp.) on the line, thereby significantly reducing potential impacts to seabirds. There were no reported impacts to protected species during this experiment. Data from 24 experimental sets indicate that researchers made 5,143 observations of black-footed albatross and 5,178 observations of Laysan albatross, among other seabird species, trailing the vessel during the study (Boggs 2001). Observations of seabirds were recorded as far back as 980 ft (327 m) from the stern of the vessel. Observers spent approximately 100 hours documenting seabird observations as part of the study, but did not observe any short-tailed albatross. No species of seabirds other than black-footed and Laysan albatross were observed to have interacted with the longline baits or gear.

Hooks Set per Unit Time and Trip Type

NOAA Fisheries has documented the take of Laysan and black-footed albatross since 1994 through its Hawaii longline observer program. "Take" typically means any interaction between a seabird and fishing gear or operations, and is usually interpreted as a bird being entangled in gear or hooked, which typically leads to death or injury. The documentation of observed take, and the data from which fleet-wide estimated have been made, has consisted largely of dead or injured birds brought up on hooks, and does not include the unknown number of injured birds that go undetected because they free themselves from fishing gear. The mortality rate of these injured birds, along with the birds documented as "released injured" by fishery observers, is unknown. The methodology used to estimate the total number of birds taken, with 95% confidence intervals, is described in the Southwest Fisheries Science Center Administrative Report H-01-03 (McCracken 2001).

It must be noted here that the rate at which albatrosses are killed in the Hawaii-based fishery appears to have changed significantly over the past several years (NOAA Fisheries 2003a, 2003b). The most significant source of change was the court-ordered closure of the swordfish sector of the fishery in 2001. This temporary closure resulted in a decrease in the number of albatrosses observed to be taken in the fishery. For example, in 2000, when approximately 3,408 shallow sets and 9,525 deep sets were conducted (without seabird deterrents; D. Kobayashi, NOAA Fisheries, pers. comm, 2004), fisheries observers recorded a total of 185 albatrosses killed and 58 injured, while in 2002, 296 shallow sets (conducted despite the closure of the swordfish fishery) and 13,816 deep sets were conducted with a higher rate of observer coverage, and observers recorded 29 dead and 3 injured albatrosses. However, shallow-set effort in the Hawaii-based longline fishery decreased steadily after 1999 (D. Kobayashi, pers. comm, 2004). Because of this decrease in the rate of shallow-set effort since 1999, we evaluate the effect of the proposed action, the reopening of the shallow-set or swordfish-target fishery, against conditions in the fishery prior to 2000.

For Laysan and black-footed albatross, Table 6 summarizes the annual (1994 - 1999) estimated rate at which birds were taken per 1,000 hooks, the fishery-wide take estimate and the 95% confidence intervals (McCracken 2001), and the total number of hooks set in the entire Hawaii-based longline fishery (*e.g.*, swordfish trips, mixed trips and tuna trips combined) (WPRFMC 1999; NOAA Fisheries unpublished data, 2004). Table 6 represents the conservative, or low, end of the range of birds that were taken per 1,000 hooks in the Hawaiian longline fishery.

Actual rates at which seabirds interact with Hawaii-based longline gear may be higher. It must be noted that between 30% to 95% of birds caught on the fishing gear during deployment and haulback may not be observed because they fall off the hook as a result of gear deployment/haulback operations or strong currents, they may be scavenged by predators during the soak, or they may be cut off by fishers during the haulback (Gales *et al.* 1998, Brian McNamara, pers. comm. 2000, Gilman *et al.*, 2003a, 2003b).

Table 6. Seabird take estimates for Hawaii-based longline fishery, 1994-1999 (estimate of birds per thousand hooks based on total hooks set in fishery). Sources: Estimate of birds per 1000 hooks calculated by Holly Freifeld, Service (July 2004; Estimated total takes/total hooks set in fishery x 1,000). Estimated total takes and 95% confidence interval calculated by Marti McCracken (2001). Total hooks set in fishery provided by Alvin Katekaru and Chris Boggs, NOAA Fisheries (pers. comm., 1999), and by Tom Swenarton, NOAA Fisheries (pers. comm. 2004).

Laysan Albatross						
	1994	1995	1996	1997	1998	1999
Estimate of birds per 1000 hooks	0.1826	0.0596	0.0816	0.0633	0.0565	0.0529
Reported kills	73	107	31	66	56	71
Estimated total kills	2,067	844	1,154	985	981	1,019
95% confidence interval	1,422 - 2,948	617 - 1,131	835 - 1,600	715 - 1,364	679 - 1,360	688 - 1,435
Total hooks set in fishery	11,319,023	14,155,169	14,141,256	15,564,321	17,365,852	19,245,593

Black-footed Albatross						
	1994	1995	1996	1997	1998	1999
Estimate of birds per 1000 hooks	0.1617	0.0801	0.1041	0.0838	0.739	0.676
Reported kills	126	105	59	107	46	70
Estimated total kills	1,830	1,134	1,472	1,305	1,283	1,301
95% confidence interval	1,457 - 2,239	899 - 1,376	1,199 - 1,811	1,077 - 1,592	1,028 - 1,601	1,021 - 1,600
Total hooks set in fishery	11,319,023	14,155,169	14,141,256	15,564,321	17,365,852	19,245,593

This information can be further refined by reporting bycatch ratios by set type (Table 7), based on information from the NOAA Fisheries observer database (1994 - 1998). When fishers targeted swordfish, about 370 birds were observed caught after 488 observed sets which results in a 0.758 bird catch per set ratio. When fishers targeted both tuna and swordfish, known as a mixed set, about 472 birds were caught after 946 observed sets which results in a 0.499 bird catch per set ratio. When fishers targeted tuna, about 16 birds were observed caught after 1,250 observed sets which results in a 0.01 bird catch per set ratio. Clearly, when fishers conducted swordfish or mixed sets, they experienced a higher bird catch ratio which is attributed to the methodology employed and/or the geographic area where this type of fishing took place. However, it is evident that the risk of interaction persists when fishers target tuna, albeit at a much reduced rate.[1]

Table 7. Incidental catch of albatrosses in the Hawaii longline fishery by set type (NMFS Observer Records 1994 – 1998; Source: C. Karnella, NOAA Fisheries, pers. comm., 2000)

Targeted Fish During Set Type	Observed Bird Catch	Number of Observed Sets	Bird Catch/Set
Swordfish	370	488	0.758
Mixed	472	946	0.499
Tuna	16	1,250	0.013

Seabird Deterrent Measures

The terms and conditions in the November 2000 Biological Opinion included minor modifications of seabird deterrent measures already implemented in the Hawaii-based longline fishery for both deep-set and shallow-set fishing. These modifications were effected in the November 2000 Opinion to ensure that a) seabird deterrent strategies would be implemented in areas where the short-tailed albatross foraging range may overlap with the fishery; b) the performance of seabird deterrent strategies would be measurable, thus providing the Service and NOAA Fisheries with information to refine and improve upon seabird deterrent measures in the future; and c) the implementation of seabird deterrent strategies was consistent with recommendations from enforcement officers.

Review of the observations of short-tailed albatrosses in Hawaii (above) demonstrates that NOAA Fisheries' proposal in 1999 to require seabird deterrent measures for all Hawaii-based longline vessels operating north of 25º north latitude did not adequately cover areas where the short-tailed albatross may occur. This species has been observed at French Frigate Shoals and as

[1] It is important to note here that vessels setting deep and targeting tuna may have higher levels of incidental catch of albatrosses when fishing in areas with high concentrations of birds, *e.g.*, in relative proximity to the Northwestern Hawaiian Islands. This event has been observed anecdotally (N. Brothers, Marine Ecology and Technology Consultant, pers. comm. 2003).

far south as Kauai. Furthermore, the foraging range of individual short-tailed albatrosses that visit Midway Atoll National Wildlife Refuge each year is unknown.

Because the swordfish sector of the Hawaii-based fishery was closed in March 2001, the seabird deterrents required in the terms and conditions of the November 2000 Opinion to reduce the risk of incidental take in swordfish-target longline fishing (thawed, blue-dyed bait, strategic offal discharge, and night setting), were implemented for insufficient time to evaluate their performance in shallow-set longline operations (NOAA Fisheries 2003a, 2003b). Therefore, our current assessment of the effectiveness of the measures required in the November 2000 Opinion is based solely on several studies conducted in Hawaii that were designed to test various seabird deterrents (Garcia *et al.* 1999, Boggs 2001, Gilman *et al.* 2002, 2003b), and one study designed to examine various gear configurations to reduce incidental take of sea turtles in shallow sets (Boggs 2002), rather than on monitoring data from the commercial fishery.

These studies remain the best available scientific information at this time regarding deterrence of seabird interactions, injuries, and mortalities associated with the Hawaii-based longline fishery. These reports supported reasonable measures that the fishery should implement to reduce the potential interaction between the fishing gear and the short-tailed albatross. In the original short-tailed albatross consultation, which relied heavily upon the Garcia and Associates (1999) study and the preliminary report from Boggs' 1999 study, the Service concurred with NOAA Fisheries that "night setting, blue-dyed and thawed bait, towed deterrent, weighted branch lines, line-setting machine and weighted branch lines, and discharge offal strategically" are, to various degrees, successful in reducing interaction and mortalities between longline gear and seabirds.

In 2002 and 2003, a consortium of parties led by National Audubon Society conducted experiments to test the effectiveness of two seabird deterrents new to Hawaii (Gilman *et al.* 2003a, 2003b). These deterrents are an underwater line-setting chute (a metal sleeve for deploying baited branch lines from the setting machine to several meters beneath the sea surface), and side setting (deploying gear from the side of the vessel instead of the stern, effectively using the vessel itself as an obstacle to albatrosses). The results of these experiments suggested that both of these methods when properly implemented are as effective as or more effective than the deterrents currently required in the fishery. Although the underwater chute effectively prevents seabirds from having access to baited hooks during gear deployment, it is still a custom-made item that is not widely available, and in trials presented several operational drawbacks that at present make it a less-than-optimal deterrent for use in the Hawaii-based longline fishery. Side setting, in contrast, was found to be highly effective, operationally simple, and popular with fishers (Gilman *et al.* 2003a). Several vessels in the fishery have voluntarily implemented side setting to reduce seabird bycatch, increase bait retention, and reduce operational burden by shifting the setting of gear to the same point on the boat where the gear is hauled in (K. Gore, pers. comm., 2004).

Night setting now is included in the proposed action as a required seabird deterrent for shallow-setting vessels fishing north of 23ºN (69 FR 17329). For the purpose of including a variable to express effectiveness of this deterrent in our calculation of incidental take, we evaluated the only two studies that have tested night setting in Hawaii: those of Garcia and Associates (1999) and Boggs (2002). In both of these studies, night setting was conducted using thawed, blue-dyed squid bait; Boggs (2002) also conducted night setting without blue dye. The mean effectiveness (rate of reduction in albatross take compared with a control) of night setting combined with blue-dyed squid documented by Garcia and Associates (1999) was 73 percent. In Boggs' (2002) study, the mean effectiveness of night setting by itself was reported as 83 to 84 percent, and the effectiveness of night setting combined with blue-dyed squid was 98 to 99 percent. These means, however, do not express the considerable variation observed in the rate of albatross contacts with bait during night setting.

Because the use of night setting as a seabird deterrent is predicated on albatross being unable to see the bait, the presence of natural or artificial light and the use of light sticks are important sources of variation in the effectiveness of this deterrent (and use of light sticks is permitted in the proposed action). Rates of albatross take during night setting in the Garcia and Associates (1999) study varied with moon phase, cloud cover, and vessel lighting, all of which affected the birds' ability to see the baited hooks in the water (B. McNamara, pers. comm., 2004). In Boggs' (2002) study, each of the three experimental trips took place over a wide range of moon phases, and presumably cloud cover varied also. These and possibly other factors are reflected in highly variable rates of albatross contacts per set, as illustrated by the large confidence intervals around the calculated mean contact rates for each treatment and the control in Boggs' (2002) study (Fig. 9). Shallow setting at night, however, clearly resulted in lower contact rates than deep setting during the day.

Only mackerel-type bait will be used in the proposed action; the use of squid bait is not permitted in the reopened Hawaii-based swordfish fishery. The observed effectiveness of night setting combined with blue-dyed squid bait, as in the Garcia and Associates (1999) study and Treatment 2 in Figure 9, thus is not applicable here. The effectiveness of dying fin-fish bait is uncertain (*e.g.*, Gilman *et al.* 2003b), although the proposed action does include dyeing bait blue as well as thawing it. Scaly fish skin is thought to not hold dye as well as squid; the older the bait is, the more likely the scales are to fall off (G. Lydon, pers. comm., 2004); and the scales of fish bait may remain a shiny attractant for seabirds even when dyed blue, even at night. Scant data exist from Hawaii on the effectiveness of dyeing fish bait blue, and those data yield conflicting results: Garcia and Associates (1999) showed that it was an effective deterrent, and Gilman *et al.* (2003b), suggest that it was not. A pilot study in New Zealand only tested dyeing procedures on fin-fish baits; the seabird deterrent effect of blue-dyed fish baits has not been tested at sea there (G. Lydon, pers. comm., 2004). More information still is needed to assess the effectiveness of blue-dyed fish bait in the Hawaii-based longline fishery.

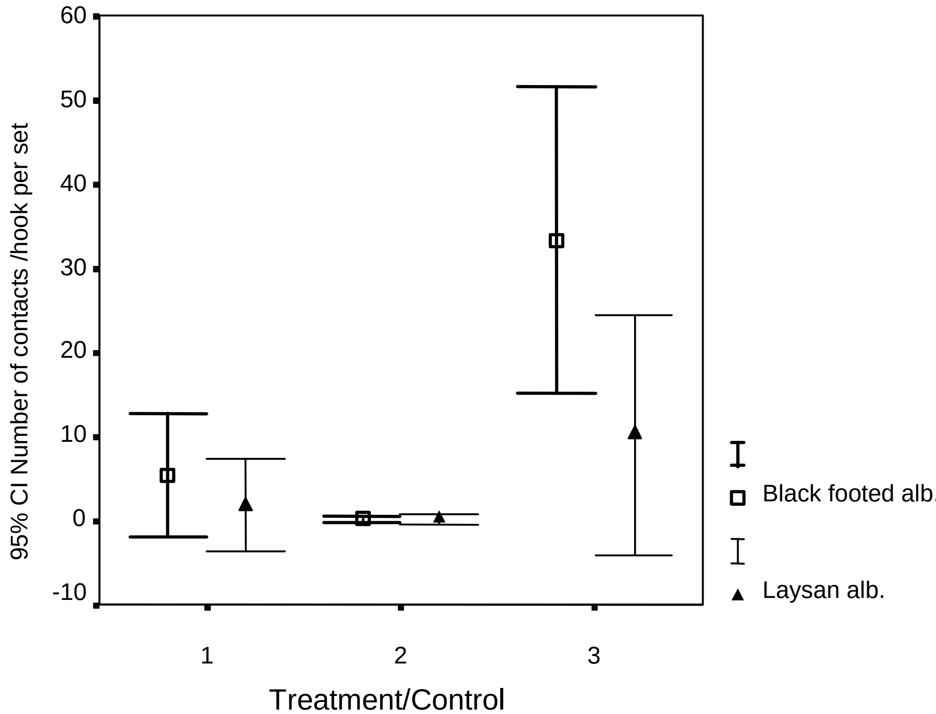


Figure 9. Number of contacts with hooks per set (confidence interval around mean): 1 = Shallow night setting; 2 = Shallow night setting with blue-dyed squid; 3 = Deep daytime setting (control). Adapted from Boggs 2002.

Observer Coverage

NOAA Fisheries observers have been deployed aboard industry fishing vessels since 1994 to collect fishery-related information and to record sightings of sea turtles, seabirds, marine mammals, billfish, sharks, and tunas (NOAA Fisheries 2004b). The rate of observer coverage has changed over time (see below). The proposed action includes observer coverage on all shallow-set Hawaii-based longline vessels. The Service has provided training in seabird identification for NOAA Fisheries observers on numerous occasions since the mandatory observer program started. Observers are currently instructed to record interactions ofseabirds with the fishing gear as well as conduct brief scan-counts and identification of seabirds at the top of each hour during haulbacks. (NOAA Fisheries defines interaction to be contact with the gear including leaders trailing off the stern of the vessel within 300 ft (100 m) of the boat. Evidence of this contact includes observations of animals at the gear; animals stealing fish from the gear or coming in contact with the gear; and evidence of fresh marine mammal or seabird damage to the catch (not by presence of damaged fish only). Sightings of short-tailed albatross are a high priority, and observers are instructed to record details of all sightings and try to photograph any short-tailed albatross sighted. Because observers have not historically allotted a portion of their time to seabird observations, and because short-tailed albatrosses are rare, the probability is remote that a short-tailed albatross would be observed through casual observation. Observers are instructed when fishing north of 23ºN to observe the setting of the longline gear until seabirds are no longer present or, in the case of night sets, until the difference between seabird species can no longer be distinguished. Also, during the haulback observers are instructed to record seabird sightings and behavior in the vicinity of the fishing gear being retrieved. In order to focus on seabird observations, when seabirds are in the area observers are asked to not record fish life history data (Circular Update, No. 55, 2002).

Between 1994 and 1996, observers had three options for describing deterrents that might be used by fishermen to keep birds away from fishing gear. Observers could record "yes" or "no" under "streamer," "bomb," or "other." They then were asked to describe the use of this deterrent and the results in the narrative section of their data form. In 1997, the data form was amended to include 12 different bird-catch reduction devices and techniques that could be checked off. In 2002, the data form was amended again to include a checklist of 14 different deterrent methods and techniques that could be checked off for use during the set, and a checklist of nine mitigation methods that may have been used during the haulback. The form also includes a space for recording how much of the set was observed as well as room for comments regarding the set and the haulback. Along with interaction and deterrent data, observers collect a suite of other information about environmental conditions, time, type of gear, technique, and location of fishing effort, which could be related to levels of bird catch. These procedures will be followed in the proposed action (K. Gore, pers. comm., 2004).

On November 17, 1998, a new instruction was issued for observers to collect and return to port any short-tailed albatross retrieved dead during longline fishing operations (NOAA Fisheries 2004b). The same memorandum asked that any seabirds that are retrieved alive have any line and hook removed if possible, be described and the characteristics recorded, have their leg band data recorded, be photographed, and released. These procedures will continue to be followed in the proposed action.

In addition, NOAA Fisheries has created a new form to report biological information about seabirds that are incidentally caught during longline fishing operations. This form includes information on placement of the hooking, how the gear was removed, morphology of the seabird, date, time, and latitude and longitude of the capture and release. In addition, observers are now instructed to retain any dead albatross for return to Honolulu. If freezer space is inadequate, only the short-tailed albatross will be retained.

There was an annual average of 1,078 longline trips during the period 1994 - 1999, and an annual average of 46 observed fishing trips, or 4.3% (NOAA Fisheries Observer Program, unpubl. data). NOAA Fisheries observers work about 10 hours per day, and reserve enough time to observe about 10% of each set during tuna trips and 3% of each set (gear deployment) during swordfish trips (Lewis Van Fossen, NOAA Fisheries, pers. comm., 1999). The peak period when seabirds interact with longline gear is during the set, although some interaction does occur during the haulback (Garcia and Associates 1999). This is especially true of swordfish-target fishing, in which the haulback typically occurs in daylight, and the strong smell of swordfish draws birds to the boat. Birds hooked during the haulback are more likely to be alive when they reach the deck of the vessel, and if proper handling procedures are followed, these birds have a chance of survival. Historically (since the inception of the observer program in 1994), very little observer time has been dedicated to looking for short-tailed albatross during the set, when seabirds are most likely to interact with longline fishing gear.

As described in the Description of the Proposed Action section, observer coverage in the reopened swordfish fishery will be 100%, that is, all vessels leaving port on shallow-set trips will carry a NOAA Fisheries observer. The tuna fishery has operated since 2001 with a court-ordered minimum of 20% observer coverage, and with at least 5% of all trips north of 23ºN carrying an observer, under the terms and conditions of the November 2002 Opinion, which still is in effect for the tuna fishery.

B. Analyses for Effects of the Action

The expected adverse effect of the proposed action is injury and/or mortality or injury of short-tailed albatrosses. Birds attempting to feed on bait may be hooked, pulled underwater as the mainline is set, and drowned. Birds also may sustain injuries from interactions with baited hooks during the process of setting and hauling back the main line, which could seriously impair them and result in mortality. Injured birds may not be detected or recorded as such; for example, an entangled or lightly hooked bird may free itself and leave the area.

The Service has considered different approaches to estimating the number of birds taken by the Hawaiian longline fishing fleet. In this section we explain how we estimate incidental take of short-tailed albatross expected as a result of the proposed action.

We have determined that short-tailed albatrosses are at risk of injury or mortality from Hawaii longline fishing operations based on the following data points: 1) documented take of Laysan and black-footed albatrosses in the fishery combined with the similarities in foraging behaviors and distributions of Laysan and black-footed albatrosses and the short-tailed albatross, 2) observation of a short-tailed albatross "actively looking for bait on hooks in haulback" behind the NOAA *R/V Townsend-Cromwell* in 1997, which supported the need for formal section 7 consultation, 3) the disappearance of "white 000" in 1994 and the possibility of mortality related to the Hawaii-based longline fishery, and 4) repeated sightings of numerous individuals over several months each year in the Northwestern Hawaiian Islands, especially Midway Atoll, that is, within the area of the shallow-set sector of the Hawaii-based longline fishery.

There are no documented instances of short-tailed albatrosses taken in the Hawaii-based fishery, probably because of a combination of factors, including low observer coverage in the fishery (1994 - 1999 average coverage: less than 5%), the allocation of observers' duties during that period, and the fact that short-tailed albatross occurrences are likely to be relatively rare because of their low population numbers worldwide.

The absence of observed and documented takes of this species in the fishery complicates our attempts to estimate the amount of take likely to occur as a result of the action. Historical information is lacking on which to base an estimate of take in the Hawaii-based fishery. Therefore, based on the similarities in foraging behavior between short-tailed, Laysan and black-footed albatross, we considered using the hooking rate of Laysan and/or black-footed albatrosses to estimate the total annual take of short-tailed albatrosses. Although crude, this represents the best available information on the number of short-tailed albatrosses likely to be taken in this fishery until such time that observer coverage of short-tailed albatross interaction with the fishery operations is increased.

Few short-tailed albatrosses exist today and even fewer have been observed in the vicinity of Hawaii. The level of risk this species experiences as a result of Hawaii-based longline fishing activities is difficult to determine because of its apparently low occurrence at fishing grounds frequented by the Hawaii-based longline fleet. Because of the rarity of the short-tailed albatross, surrogate species may be used to assess the effect of the action (Section 7 Consultation Handbook, p. 4-47). Our knowledge of the foraging behavior of the three species of *Phoebastria* albatross that occur in the North Pacific (which includes the action area), and the existing data collected in various studies of seabird deterrents suggest that (1) these species behave similarly with respect to longline fishing, and (2) a deterrent that is effective for one species is likely to be effective for all three. The use of specific data on the behaviors and mortality of Laysan and black-footed albatross, then, is a practical and sound method of assessing and monitoring risk of take and the use of measures to minimize take of short-tailed albatross.

The following approach for estimating incidental take indicates that we can expect 1 (one) short-tailed albatross per year to be taken in the shallow-set component of the Hawaii-based longline fishery. Based on Southwest Fisheries Science Center Administrative Report H-01-03, "Estimation of Albatross Take in Hawaiian Longline Fisheries" (McCracken 2001) and unpublished data from NOAA Fisheries (K. Busscher and T. Swenarton, pers. comm., 2004), we can calculate the number of birds (Laysan and black-footed albatross) per 1,000 hooks that were killed in the Hawaii-based longline fishery prior to the reduction and closure of the swordfish fishery. We acknowledge that those rates are not directly comparable to the entire population of short-tailed albatross because of species differences, including breeding colony location and the resultant difference in distribution; however, they provide the best basis for estimating incidental take of short-tailed albatross in the vicinity of the Hawaiian Islands.

Laysan and black-footed albatross appear in this area in greater numbers than short-tailed albatrosses because their worldwide population numbers are significantly higher, and because the primary breeding colonies for these two species are within the boundaries of the Hawaiian Islands National Wildlife Refuge. The primary breeding colony for short-tailed albatross is in Japan. Because of the differences in geographic locations of these breeding colonies, we would not expect to see the worldwide population of short-tailed albatross affected by the proposed action in exactly the same manner as the worldwide population of Laysan or black-footed albatross.[2] However, because there are longline fishery-causeed mortalities of Laysan and black-footed albatross in the vicinity of the Hawaiian Islands National Wildlife Refuge, and because short-tailed albatross have been sighted in this vicinity, a small percentage of the world-wide population of short-tailed albatross may be adversely affected (taken).

A percentage of the short-tailed albatross (subadult and adult) population traverses the area where the Hawaii-based longline fishery operates. A percentage of these birds may be killed or injured as a result of the fishery's operation. Between 1938 and 2004, at least 17 different individuals were observed about 50 times (observations range from flyovers to part-time residents), with most of the observations from land. The first recorded at-sea observation of a short-tailed albatross in the vicinity of the Northwestern Hawaiian Islands was from the *R/V Townsend-Cromwell* in 1997. This observation was made by a fishery biologist who was trained in seabird identification. This was the first time a biologist, trained in seabird identification, served aboard a vessel to observe seabird behavior within the area where this fishery operates.

Short-tailed albatross range from Torishima in the western Pacific as far away as the Bering Sea, the Aleutian Islands and southern Alaska, the west coast of North America, and Hawaii. We acknowledge that the occurrence of short-tailed albatross in the Pacific is not necessarily evenly or randomly distributed throughout the species' range. However, absent specific data, we can use the generalized overlap of the range of the short-tailed albatross with the area in which the fishery operates to derive a coarse estimate of the proportion of the short-tailed albatross population which may be vulnerable to Hawaii-based longline fishing activities.

The distribution of the short-tailed albatross is approximately 4,040,441,000 hectares (Fig. 6). Because most observations of short-tailed albatross beyond the Torishima breeding colony occur in the vicinity of the coastal waters of the North American continent, an "oceanic flyway" may exist between the breeding colony and North America. Based on Service and NOAA Fisheries observations of short-tailed albatross, the Service suspects that the Northwestern Hawaiian Islands are a part of this "flyway" for birds that transit to and from the North American foraging grounds. The Service can only estimate the percentage of the total short-tailed albatross population that may transit through this general area, and generate a coarse but functional estimate of take that may occur annually in this fishery.

The generalized area in which longline vessels registered in Hawaii operate and overlap with the range of the short-tailed albatross (Fig. 7) is approximately 989,651,000 hectares or 24.5% of the range of the bird. We consider the generalized area to suffice because the geographic distribution of swordfish- and tuna-target fishing in the Hawaii-based fishery have largely overlapped historically, although some tuna sets occur south of the southern limit of swordfish fishing, and some swordfish sets occur east and north of the eastern limit of tuna fishing.

---

[2] Japan also harbors several small colonies of the black-footed albatross. Bands taken from black-footed albatrosses caught in the Hawaii-based longline fishery indicate that Japanese black-footed albatrosses forage in and transit the area where this fishery operates and for pelagic seabirds breeding in Japan to occur in the vicinity of Hawaii is not an anomaly (E. Flint, pers. comm., 2004).

We estimate that throughout the course of one year, about 488 (or 24.5% of the estimated 1,990 of the worldwide population; Sievert 2004) short-tailed albatross may be present within the area where the range of the bird overlaps with the Hawaii-based longline fishery (Fig. 7). We can estimate the number of birds that may be taken as a result of the Hawaii-based longline fishery by comparing the number of short-tailed albatross that may appear in the vicinity of the Hawaii-based longline fishing area with the estimated proportion of black-footed albatross that are killed by the fishery in this same area. We choose to compare the short-tailed albatross with black-footed albatross because both species are larger than the Laysan albatross and may outcompete Laysan albatrosses for food due to their size and behavior. Furthermore, the NOAA Fisheries observations of short-tailed albatrosses (March 1997 and February 2000) indicate that they were flying by primarily in the company of black-footed albatrosses. In March 1997 a juvenile short-tailed albatross was observed in the company of about 30 black-footed albatrosses by a NOAA Fisheries biologist from the *R/V Townsend-Cromwell*; in February, 2000 a juvenile short-tailed albatross was observed in the company of about 10 - 15 black-footed albatrosses by a NOAA Fisheries observer from a Hawaii-based longline fishing vessel.

NOAA Fisheries estimated that 6,681 - 10,219 black-footed albatrosses (sum of upper and lower 95% prediction intervals calculated for data collected by fisheries observers) were taken by Hawaii-based longliners fishing for both tuna and swordfish between 1994 and 1999 (McCracken 2001). The average annual rate of mortality predicted for the black-footed albatross, in proportion to its population size, and an adjustment for the resumption of shallow-set longlining at the level of 2,120 sets per year, with night setting required, are used as proxy variables for determining the risk of incidental take for the rare short-tailed albatross. Shallow-set longlining was calculated to account for approximately 60% of the estimated take of albatrosses in the fishery (November 2000 Opinion, p. 37).

The estimated number of black-footed albatrosses worldwide was about 277,675 in 1999, and was assumed to be roughly similar when incidental take of the short-tailed albatross was calculated for the November 2000 Biological Opinion. This estimate was based on calculations and assumptions (including survivorship and reproductive success) in Cousins and Cooper (2000). Using these methods and assumptions, we determined that there were approximately 138,963 breeders and about 138,712 non-breeders in the population. This estimate is based on the proportion of the black-footed albatross world population (95%) that was counted in 1999. We use the 1999 population estimate and calculation of the rate of interactions[3] of black-footed albatrosses with Hawaii-based longline fishery operations because this rate also uses observed and fleet-wide estimates of take from 1994 to 1999. Subsequent to 1999, swordfish effort decreased significantly.

[3] NOAA Fisheries uses the term "take" to describe "an interaction between a seabird and anything related to the activity of fishing, and it usually implies that the seabird became entangled in the line or was caught on a hook" (McCracken 2001). Because "take" has a specific meaning with respect to listed species, we use the term "interaction" to refer to entanglement or hooking of (non-listed) black-footed and Laysan albatrosses, and reserve the term "take" for use in reference to the short-tailed albatross. We maintain that such interactions between albatrosses and longline fisheries, especially during the set, typically result in albatross mortality.

The model used in the November 2000 Opinion and the November 2002 revised Opinion to estimate take of short-tailed albatrosses by the commercial longline fishery is presented below and updated to reflect the fishery operation as described in the proposed action and other new information. Because take of short-tailed albatrosses has not yet been observed and reported in the Hawaii-based fishery, the model hypothesizes an annual short-tailed albatross take based on the average 1994 - 1999 annual rate of black-footed albatross interactions, and assumes that the Hawaii fishery affects only the fraction of the short-tailed albatross population that is present within the range of the Hawaii-based fishery. The model used the following variables:

Fishery take (M) = 0.0082/year	Rate based on the 6-year (1994 - 1999) average of the estimated annual mortality of black-footed albatrosses by the Hawaii-based longline fishery operating without seabird deterrents (= 1,388 birds), adjusted by a fall-off or removal rate of 31%[4] (= 1,860), divided by the estimated black-footed albatross population size in 1999 (= 227,675 birds).

If this take proportion is applied to the estimated current world population of 1,990 short-tailed albatrosses, we would estimate that about 16 would be taken each year by the Hawaii-based longline fleet under similar conditions. However, we scaled the exposure of the short-tailed albatross population to the geographic area where their range and the operation of the fishery overlap.

At-risk area (A) = 0.245	Fraction of the short-tailed albatross range that overlaps with the Hawaii-based longline fishery (November 2000 Opinion, p. 40).
Population (N) = 1,990 birds	Most recent population estimate for the short-tailed albatross (Sievert 2004).

The estimated take (T) of short-tailed albatrosses in the Hawaii-based fishery based on historical levels of fishing effort and albatross take, scaled to the area of overlap between the species' range and the fishery, and updated with the current short-tailed albatross population estimate is calculated as:

T = M x A x N, or

[4] In the 2002 revised Opinion, we adjusted (M) to reflect new data on the fall-off or removal (by sharks or other scavengers) of hooked birds prior the haul. Studies of fall-off in other regions were cited in the November 2000 Opinion, but none had been conducted in the Hawaii-based fishery, and no variable reflecting this fall-off was included in the calculation of incidental take of short- tailed albatrosses. Data on fall-off rates were collected during experiments conducted in Hawaii in 2002 and 2003 to test the efficacy of underwater line chutes and side setting as seabird deterrents. Gilman *et al.* (2002, 2003b) found that 34% and 28% of birds observed to be hooked during the set in 2002 and 2003, respectively, were not found on the line when the gear was hauled in. For the purpose of calculating incidental take in this Biological Opinion, we have taken the average of these two results, and assumed a fall-off rate of 31%.

T = 3.99 or 4 short-tailed albatrosses per year.

To use this model to estimate short-tailed albatross take under the new proposed action, which limits the total number of shallow sets to 2,120 per year in the Hawaii-based longline fishery, we next scaled the extent of the proposed action (E) to account for the change in shallow sets relative to historical levels of shallow sets. This historic level was determined by NOAA Fisheries by combining sets logged as swordfish-target sets, and sets logged as "mixed" sets that were determined to be shallow sets either because they had fewer than 10 branch lines per float or had light sticks (D. Kobayashi, NOAA Fisheries, pers. comm., 2004). The annual average number of shallow sets between 1994 and 1999 was 4,243.

Extent of the proposed action (E) = 0.5	The calculated change in shallow set effort in the proposed action when compared with the 1994-99 annual average, or 4,243/2,120

Therefore, our estimation of take (T) of short-tailed albatrosses in the Hawaii-based fishery, as calculated above, scaled to the extent of the proposed action is:

T = M x A x N x E, or
T = 1.995 or 2 short-tailed albatrosses per year.

Finally, we added a new variable (S) to describe the estimated effectiveness of night setting, which now is included as a required seabird deterrent in the proposed action. Because of the unsuitability of using data from night setting research that included blue-dyed bait (as described above in the Seabird Deterrent Measures section), this calculation is based on bait contact rates for black-footed albatross observed during night setting without blue-dyed bait in Boggs' (2002) study.

Although considerable variation exists in the rates of albatross contact with baited hooks during night setting (as described above in the Seabird Deterrent Measures section, and see Fig. 9), statistical complexities and time constraints prevented calculation of a numerical expression of variance around the mean contact rates reported in Boggs (2002) (C. Boggs, pers. comm., 2004). Furthermore, the reported means are for a sample size of three (3) trips, each trip value itself is a mean of the 10 or 13 sets conducted per trip (Table 8, Boggs 2002), and information about the within-trip variation in contacts per set is not available[5]. Therefore, to account for the variability suggested by the confidence intervals in Figure 9 and make the most conservative estimate of night setting effectiveness for the purpose of this biological opinion, we have examined the effect of night setting on total estimated incidental take using several values for (Ni), including the potential effect of doubling the average of the three mean contact rates (Table 9).

[5] The set-by-set data from Boggs (2002) study were not available during this consultation's timeframe (C. Boggs, pers. comm., 2004). The set-by-set data would increase the sample size from three trips to 33 sets each for night setting and daytime setting and thus provide substantially more information for evaluating the variability in albatross contact rates during night setting recorded in this study.

Night setting effectiveness (S) = Ni/D where (Ni) is 5.41, the average of three trip means of black-footed albatross contacts per set for "shallow night setting" and (D) is 33.28, the average of three trip means of contacts per set during "deep daytime setting," as reported in Boggs (2002) (Table 7). Four values for (Ni) were examined (Table 8).

Table 8. Mean contact rates per set, by trip, and averages for three trips, for deep day setting and for night setting without blue-dyed squid bait. Data from Boggs (2002).

Control/Treatment	Number of Sets	Mean Black-footed Albatross Contacts /Set	
Deep daytime setting			
Trip 1	10	36.70	
Trip 2	13	38.23	
Trip 3	10	24.90	
Average of mean contacts/set			33.28
Night setting			
Trip 1	10	5.70	
Trip 2	13	8.23	
Trip 3	10	2.30	
Average of mean contacts/set			5.41

Table 9. Calculation of night setting effectiveness (S) for the black-footed albatross using a range of alternative values based on data in Boggs (2002). These values are: the average of the three trip means of contacts per set, high mean contacts per set (Trip 2 from Table 7; Boggs 2002), and each of those values doubled to represent variability, during night setting (Ni), and the average of three trip means of contacts per set during deep daytime setting (D).

Ni	D	S= Ni/D	Calculated Estimated take	Total estimated take (rounded)
5.41 (average of means for 3 trips)	33.28	0.15	0.30	1.0
10.62 (doubled)	33.28	0.32	0.64	1.0
8.23 (highest mean – Trip 2)	33.28	0.25	0.50	1.0
16.46 (doubled)	33.28	0.50	1.0	1.0

In summary, the estimated take (T) of short-tailed albatrosses in the Hawaii-based fishery based on historical levels of fishing effort, albatross take, the extent of the current proposed action, and a conservative estimate of the effectiveness of night setting is calculated as:

T = M x A x N x E x S

We examined four possible values representing the effectiveness of night setting in reducing estimated incidental take of short-tailed albatross in the proposed action. The purpose of examining this range was to account for the apparent but unquantified variation in night setting effectiveness in Boggs' (2002) study (C. Boggs, pers. comm., 2004) and in the Garcia and Associated (1999) study (B. McNamara, pers. comm, 2004). The resulting estimated incidental take of short-tailed albatrosses in the shallow-set Hawaii-based longline fishery ranges from 0.30 to 1.0. Because these estimates are based on various assumptions, any fractional results of a quantitative estimate of incidental take should be rounded up to the next whole number. Thus, in this case, we conservatively determine that shallow-set operations of the Hawaii-based longline fishery may result in the take of 1 (one) short-tailed albatross per year in the form of mortality. Because of the current size and growth rate of the short-tailed albatross population, this level of take is determined not to jeopardize the continued existence of the species[6].

C. Species Response to the Action

In evaluating the effects of the continued operation of the longline fishery for the November 2000 Opinion, we developed a Population Viability Analysis to estimate the mortality of short-tailed albatrosses necessary to cause extinction of the species. We also considered the impact of lost future productivity of a bird to the species. We present those analyses again here. In recognition of the many limitations of PVAs and uncertainties inherent in the outputs of such models (see Reed *et al.* 1998), we present this model only for illustration, not for prediction or prescription.

Population Viability Analysis

In an effort to better understand the impacts of fisheries take on the short-tailed albatross population, the Service prepared a preliminary Population Viability Analysis (PVA) in 1999. PVAs are predictive models used to evaluate the effect on populations of changes in a species' environment, demography, or vital rates (Lacey 1993). Such models often are used to evaluate extinction risks and management options for rare or threatened species (Meffe and Carroll 1997). Data and general information for this analysis was obtained from Hiroshi Hasegawa (pers. comm., 2000) and from Cochrane and Starfield (1999). The PVA was done using VORTEX Version 7.2. VORTEX is produced and maintained by Robert Lacy, Department of

---

[6] Note that in addition to this estimate, the estimated incidental take of the short-tailed albatross in the deep-set, tuna-target sector of the fishery in November 2002 revised biological opinion is 1 (one) bird. Combining the estimated incidental take for both the deep- and shallow-set fisheries yields a total estimated incidental take of two (2) short-tailed albatrosses per year in the Hawaii-based longline fishery.

Conservation Biology, Chicago Zoological Society, Brookfield Zoo and the most recent version of the software can be obtained at no cost at internet web page: http://www.vortex9.org/vortex.html.

The PVA used the following values as the best available data on the current life-history traits of Torishima Island short-tailed albatross. The Torishima colony harbors the majority of the world short-tailed albatross population, and this colony has been closely monitored for several decades; therefore, data from the Torishima colony represent our most precise knowledge of the species. For this reason, data from the much smaller Senkaku Islands colony were not included in the model. Variances and average values for juvenile and adult mortalities, and for breeding rate of adults were obtained from Cochrane and Starfield (1999) (See output summarized in Appendices A-6, A-7, and A-8).

Age at first reproduction for males and females = 7 years
Maximum life span = 50 years
Annual fecundity = 1 egg
Initial population size = 1170 birds in a stable age distribution
Breeding rate of adults = 75% ± 10% of all adults breed each year

Baseline Adult and Juvenile Survivorship:

1. Annual Adult Survivorship = 95.5% (4.5% mortality) ± 2.0%.
2. Annual Juvenile Survivorship = 91.0% (9% mortality) ± 4.0%; note that this is for years 1-7.
3. Year 0-1 Survivorship = 56.2% (43.8% mortality) ± 5.8% This is determined from the first 6 months of survivorship from egg to fledgling and survivorship of juveniles during the first 6 months of juvenile life. Survival from egg to fledgling is determined from Hasegawa's data for years (1980-1996) without storms (See Attachment G and H; 58.9% ± 7.742%); very similar to the Cochrane and Starfield (1999) estimate of 55% average for nest success rate. Survivorship of juveniles during the first 6 months of juvenile life is the same as the baseline juvenile survivorship.

It should be noted that there are no available data on variances in the mortalities of juvenile and adult short-tailed albatross. Consequently, the comparatively low variances given above may underestimate real-world fluctuations in the size of the Torishima Island population. This underestimate may be compounded by the fact that the impacts of tropical storms or the potential eruption of the Torishima volcano are not specifically addressed in this PVA. A brief examination of Hasegawa's data indicates that storms can reduce breeding success by approximately 15%. A volcanic eruption on or near Torishima Island during the breeding season could have catastrophic effects on breeding success for that year and may also result in the death of many of the adult birds sitting on nests at the time of the eruption. These factors should be taken into consideration when evaluating the long-term dynamics of the short-tailed albatross population.

Take in fisheries has been documented in Alaska-based fisheries, and this take is a source of juvenile and adult short-tailed albatross mortality. Of the 7 observed takes in the Alaska fishery, 6 were juveniles and 1 was an adult. Fishery takes were modeled as increases in juvenile and adult mortalities. These increases were maintained at the observed 6 to 1 ratio and were modeled at five levels:

- Current mortality estimates: 9% annual juvenile mortality and 4.5% annual adult mortality;
- 11% annual juvenile mortality and 4.83% annual adult mortality;
- 13% annual juvenile mortality and 5.17% annual adult mortality;
- 15% annual juvenile mortality and 5.5% annual adult mortality;
- 17% annual juvenile mortality and 5.83% annual adult mortality.

The population size results for these varying levels of mortality are presented in Appendix A-6.

Although the PVA analysis indicates that the Torishima Island short-tailed albatross population is resilient, it is apparent from the analysis that impacts from fisheries-related mortality represent a significant hurdle to reestablishing a large population with multiple breeding sites, the historic condition of this species (see Appendix A-6: PVA of the effects of fisheries take on juveniles and adults). The PVA analysis also indicates that relatively small increases in the taking of juvenile and adult birds can significantly slow population growth, and if take increases by more than 8% for annual juvenile mortality and 1.33% for annual adult mortality, then the species will most likely go extinct, given the conservative parameters used in the model (Appendix A-6):

Table 10. Population viability analysis results for modeled increases in adult and juvenile short-tailed albatross takes.

Percent increase in annual juvenile mortality	Percent increase in annual adult mortality	Approximate years to double current population size
2 (11 total)	0.33 (4.83 total)	21
4 (13 total)	0.67 (5.17 total)	27
6 (15 total)	1 (5.5 total)	50
8 (17 total)	1.33 (5.83 total)	130
> 8	> 1.33	N/A (extinction)

As indicated above, there is a significant jump in the time required to double the current population size when juvenile and adult mortalities exceed 13% and 5.17%, respectively: a 4% increase in the annual juvenile mortality (total 13%) and a 0.67% increase in the annual adult mortality (total 5.17%) increases the time to double the current population by approximately 6 years, whereas a 6% increase in the annual juvenile mortality (total 15%) and a 1% increase in the annual adult mortality (total 5.5%) increases this time by approximately 23 years. An 8% increase in the annual juvenile mortality (total 17%) and a 1.33% increase in the annual adult mortality (total 5.83%) increases the time to double the current population by approximately 80 years. Consequently, annual juvenile and adult mortalities that do not exceed 13% and 5%, respectively, for the Torishima Island population, should not change the current rate of population growth in this species.

In evaluating long-term growth of the short-tailed albatross population, it is important to note that the population growth trajectories discussed above continue to diverge through time (see Appendix A-6). For instance, growth to a population size of 15,000 birds will require approximately 58 years at current levels of mortality. A 2% increase in the annual juvenile mortality (total 11%) and a 0.33% increase in the annual adult mortality (total 4.83%) will increase the time to reach 15,000 birds by approximately 21 years; a 4% increase in the annual juvenile mortality (total 13%) and a 0.67% increase in the annual adult mortality (total 5.17%) will increase this time by approximately 50 years. Consequently, a total annual mortality of around 11% for juveniles and 4.83% for adults might include both short-term reductions in population growth and longer-term rebuilding of the historic short-tailed albatross population.

Additional breeding sites can greatly assist in the rebuilding of the short-tailed albatross population from its dangerously small current size. Establishment of additional short-tailed albatross breeding sites should be considered on Pacific islands that can be managed to protect the birds. The Northwestern Hawaiian Islands that are on secure Service Refuge lands are an example of potential breeding sites. These U.S.-owned islands are currently managed to protect seabirds and represent a unique opportunity for conservation of short-tailed albatross. Additionally, known historic sites should be evaluated as possible sites for reintroduction of short-tailed albatross. Current loss of reproductive contribution, or a small increase in loss, due to adverse effects by the fisheries may slow the building of the short-tailed albatross population, and new sub-populations would aid in buffering the species from stochastic processes or increased take in fisheries. These ideas, and others, are under review by our short-tailed albatross recovery team as they work to draft the recovery plan for this species.

According to information provided by Hasegawa for the PVA conducted in 1999, the worldwide population of short-tailed albatross was about 1,362 birds, roughly half juveniles and half adults. Based on the PVA and its assumptions, at that population size, an annual loss of about 82 subadult s (17% mortality) and 12 adults (5.83% mortality) would lead to eventual extinction of the species. The increase of the short-tailed albatross population since 1999 likely increases the numbers needed to achieve those thresholds. Because the current total annual estimated loss of reproductive contribution due to adverse effects by U.S. fisheries (*i.e.*, 2 short-tailed albatross [Hawaii] + 2 short-tailed albatross [Alaska] = 4 per year) falls short of those levels, the Hawaii-based longline fishery may slow population growth of the species, but is not anticipated to jeopardize the continued existence of the species. Additional data may change the assumptions of our analysis.

V. Cumulative Effects

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

There is potential for oil spills to occur in the action area which could affect short-tailed albatrosses. Service refuge managers and biologists stationed at Midway Atoll National Wildlife Refuge, Tern Islet (French Frigate Shoals) and Laysan Island - Hawaiian Islands National Wildlife Refuge have observed that some seabirds from local breeding colonies die from oil-related impacts. The sources of the oil spills are unknown. However, it is speculated that oil released on the high seas by vessels transiting the central Pacific Ocean may be responsible for these oil-related injuries. Vessels that have sunk in the vicinity of the Hawaiian Islands National Wildlife Refuge may periodically release oil from fuel tanks.
Discarded plastic cigarette lighters and light sticks that drift away from longline gear, among other plastic debris, float in the water column and are consumed by seabirds while they are foraging. The ingestion of plastic may compromise seabirds and result in dehydration and starvation, intestinal blockage, internal injury, or exposure to dangerous toxins (Cousins 1998; Sievert and Sileo 1993). Both Laysan and black-footed albatross that occur within Hawaiian waters have been documented to be affected by plastic debris (WPRFMC 1998).

Drift and trawl nets accumulate in the Northwestern Hawaiian Islands and entangle protected species such as sea turtles, the Hawaiian monk seal and seabirds. A multi-agency State and Federal effort is underway to remove driftnets from several locations within the Hawaiian Islands National Wildlife Refuge. However, as long as fisheries continue to lose fishing gear, protected species will continue to become entangled. At this time, there is not enough information about the threats described above and their impacts on short-tailed albatross to determine the level of impact they might have on the species.

The action area encompasses ocean areas outside the range of most State and private activities. State and U.S.-based private fishing activities, that may affect the short-tailed albatross, such as domestic tuna trolling, occur within the action area. These activities are regulated by the Federal government under the Magnuson Act, but no data exists to evaluate these fisheries. Consistent with applicable consultation regulations, the future effects of domestic fishing activities subject to consultation under the (Endangered Species) Act need not be considered in this analysis.

Japan, Taiwan, Korea, and other fishing nations operate longline vessels in areas which overlap with the known range of the short-tailed albatross and may interact with this species in the action area. However, these nations do not report the rate at which seabirds are caught on longline gear. In order to estimate seabird bycatch rates, foreign vessels should report the rate at which seabirds are caught per 1,000 hooks fished. The very limited information available about seabird bycatch in foreign fishing fleets is summarized in Appendix 1 of HLA and WPRFMC (2004). Without more consistent and detailed information about seabird take in foreign fisheries, we cannot estimate the adverse effects that these fisheries may have on the short-tailed albatross.

VI. Conclusion

At the current population level and the current population growth rate, the level of mortality expected to result from the reopened shallow-set longline fishery in Hawaii, as described in the Description of the Proposed Action section, above, is not likely to jeopardize the continued existence of the short-tailed albatross.

VII. Incidental Take Statement

Section 9 of the Act and Federal regulations pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of sections 7(b)(4) and 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by NOAA Fisheries so that they become binding conditions of any authorization of the fishery as appropriate, for the exemption in section 7(o)(2) to apply. NOAA Fisheries has a continuing duty to regulate the activity covered by this incidental take statement. If NOAA Fisheries (1) fails to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, NOAA Fisheries must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR §402.14(I)(3)].

A. Amount or Extent of Take Anticipated

The Service anticipates that one short-tailed albatross per year may be taken as a result of the Hawaii-based shallow-set longline fishing activities regulated by NOAA Fisheries, as calculated in the Analyses for Effects of the Action section, above. The incidental take is expected to be in the form of mortality. An unknown number of short-tailed albatrosses may suffer take in the form of harassment, harming, or wounding. That is, some birds may interact with gear and free themselves without being detected. This form of take differs from the estimated incidental take (*i.e.*, in the form of mortality) in that these birds are injured to an unknown extent and have an unknown likelihood of survival.

Because the Service defines take of short-tailed albatrosses to include mortality resulting from physical interaction with longline gear, it is not necessary to have a dead bird in hand to document take. The record of a short-tailed albatross physically interacting with gear and being hooked and/or obviously injured or killed is sufficient.

The Service considers the observation of a short-tailed albatross in the vicinity of the vessel, actively looking for food, to represent an unknown number or index of short-tailed albatrosses that risk being taken in the Hawaii-based longline fishery. Given NOAA Fisheries' historically low level of observer coverage (approximately 4 to 5% from 1994 to 2001) and the absence of reported observed takes of short-tailed albatrosses in the Hawaii longline fishery, the Service is not able to calculate the rate at which short-tailed albatrosses forage for bait on hooks or "strike a hook," and the number that these observations may represent in terms of birds actually killed or injured. Because an interaction is a behavior that has been documented to precede take in the form of injury or mortality in Laysan and black-footed albatrosses, such interactions must be recorded, although for the purposes of tracking incidental take under this biological opinion an interaction only (*i.e.*, not resulting in obvious injury or mortality) does not constitute a take of a short-tailed albatross. In the Reasonable and Prudent Measures below, we include a requirement for specific observer duties that we believe will begin to address the dearth of information about the presence and behavior of short-tailed albatrosses in the areas where the shallow-set Hawaii-based fishery operates. When we obtain additional data and/or other information about interactions between short-tailed albatrosses and longline gear deployed by Hawaii-based vessels, we may revise this assessment of incidental take.

B. Effects of the Take

The Service has estimated that one (1) short-tailed albatross per year may be taken as a result of the proposed action. This estimate is based on certain assumptions relative to the bird's behavior and distribution in the area of the Hawaiian Islands and its possible interaction with the Hawaii-based longline fishery.

Based on the PVA conducted in 1999 and its assumptions, an annual level of death of about 81.9 subadults (17% mortality) and 11.7 adults (5.83% mortality) would lead to eventual extinction of the species (see the Species Response to the Action section, above). The increase in the short-tailed albatross population since 1999 likely changes these thresholds slightly, and reduces the likelihood that take as a result of the proposed action will exceed these thresholds. Therefore, the shallow-set Hawaii-based longline fishery may slow population growth of the species, but it is not anticipated to jeopardize the continued existence of the species. Furthermore, the short-tailed albatross population has continued to grow despite documented and undocumented mortality in U.S. and foreign commercial fisheries (Sievert 2004). The Service therefore concludes that the level of take anticipated in the shallow-set Hawaii-based longline fishery will not jeopardize the continued existence of the short-tailed albatross, nor will the proposed action result in destruction or adverse modification of critical habitat, as critical habitat is not designated for this species.

The Service will not refer the incidental take of any migratory bird (in this case, the short-tailed albatross) for prosecution under the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. §§703-712), if such take is in compliance with the terms and conditions (including amount and/or number) specified herein.

C. Reasonable and Prudent Measures

The Service believes that the following reasonable and prudent measures are necessary and appropriate to minimize the potential for and impact of the incidental take of short-tailed albatrosses:

I. Minimize attraction of short-tailed albatross to fishing gear used by the Hawaii-based longline fishery.
II. Monitor the level of take and measures to minimize take.
III. Ensure survivability of injured short-tailed albatrosses.

D. Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, NOAA Fisheries must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and specify reporting requirements. These terms and conditions are non-discretionary. The terms and conditions for each reasonable and prudent measure are organized as follows:

I. Minimize attraction of short-tailed albatross to fishing gear used by the Hawaii-based longline fishery.
  - I.A. Side setting and Implementation Timeframe
  - I.B. Additional Seabird Deterrents

II. Monitor the level of take and measures to minimize take in the shallow-set longline fishery.
  - II.A. Annual Reporting
  - II.B. Observer Coverage
  - II.C. Short-tailed Albatross Observer Duties
  - II.D. Observations of Short-tailed Albatross
  - II.E. Quarterly Reports – NOAA Fisheries Observer Program

III. Ensure survivability of injured short-tailed albatrosses and proper identification of short-tailed albatrosses

III.A. Handling and Rehabilitation of Injured Short-tailed Albatross

III.B. Disposition of Dead Short-tailed Albatross

III.C. Annual Workshops

III.D. Albatross Species Identification Card

In order to implement reasonable and prudent measure I above, the following terms and conditions apply:

I.A. Side-setting and Implementation Timeframe: The proposed action, the reopening of the shallow-set or swordfish sector of the Hawaii-based longline fishery, includes several seabird deterrents measures to be employed north of 23ºN: (1) all sets will use completely thawed and blue-dyed baits, regardless of bait type, as described in the November 28, 2000 Opinion, (2) offal will be deployed strategically to distract birds from pursuing baited hooks, and (3) all setting will take place at night using the minimum vessel lighting needed for crew safety, beginning no earlier than one hour after sunset at the vessel's location, and terminating no later than local sunrise. These measures have been adopted through regulation at 50 CFR 660.35 (2004), and are currently binding on the fishery. For the purposes of this opinion, the Service adopts the NOAA Fisheries definition of set types for shallow sets when deploying longline gear from Hawaii-registered vessels. This definition is described in the *Federal Register* (69 FR 17329).

Although research has shown these seabird deterrents to be effective, and we believe they minimize the risk of incidental take of the short-tailed albatross, these deterrents do have several drawbacks, as described above in the discussion of seabird deterrents in the Effects of the Action section. For example, the few existing data are equivocal about the effectiveness of blue-dyed fin-fish bait as a seabird deterrent in the Hawaii-based fishery. In fact, mackerel-type bait fishes have been shown to hold dye less well than squid, a bait that was previously used in the Hawaii-based shallow-set fishery (G. Lydon, pers. comm., 2004). Furthermore, the effectiveness of night setting likely varies considerably with ambient and artificial light (B. McNamara, pers. comm., 2004).

In new research on seabird deterrents in the Hawaii-based fishery (Gilman *et al*. 2002, 2003a, 2003b), side setting, that is, deploying longline gear from amidships instead of the stern, has yielded promising results as a highly effective seabird deterrent. Side setting also meets several other important criteria for seabird deterrents: it is easy to implement and compliance with a side setting requirement would be easily verified. To date, however, we have insufficient information about the performance of side setting in the fishery at large or over time, and few data about its performance on shallow sets, where, for example, baited branch lines may carry buoyant light sticks and may clear the stern of the vessel before reaching a depth where hooks are unavailable to seabirds. We wish to see assessment of this performance prior to requiring side setting as an adequate and reasonable long-term replacement for some or all of the seabird deterrents currently in use in the shallow-set fishery to minimize the risk to the short-tailed albatross. In response to these points and to the considerations about other deterrents described above, and to employ the best available scientific information on seabird deterrents, we provide the following process for NOAA Fisheries to assess the fishery-wide performance of side setting, and develop a plan for its implementation and monitoring under new fishery regulations. We acknowledge that the National Environmental Policy Act (NEPA) review that is currently underway, and/or future research, may yield a seabird deterrent or combination of deterrents that is as effective as or more effective than side setting and that also meets other criteria (*e.g.*, ease of implementation and compliance monitoring).

I.A.(1). In addition to the 100% observer coverage on shallow-set vessels and within the 20% observer coverage on deep-set vessels, NOAA Fisheries will to the greatest extent possible place trained observers on deep-set vessels that voluntarily implement side setting to document side setting procedures and collect data on take of seabirds. NOAA Fisheries will encourage vessels targeting swordfish to side set. Vessels that voluntarily side set should ideally adhere to the following specifications, but information from vessels that deploy gear from amidships but do not strictly follow these specifications still is extremely valuable.

- Weights: attach a 60-gram swivel within 1 m (3 ft.) of the hook on each branch line;
- Set gear amidships as far forward from the stern as possible;
- Deploy a bird-scaring curtain between the setting position and the stern, as shown below in Figure 10;
- Throw baited hooks forward as close to the vessel hull as possible;
- Clip deployed branch lines to the mainline the moment that the vessel passes the baited hook to minimize tension in the branch line, which could cause the baited hook to be pulled towards the sea surface.

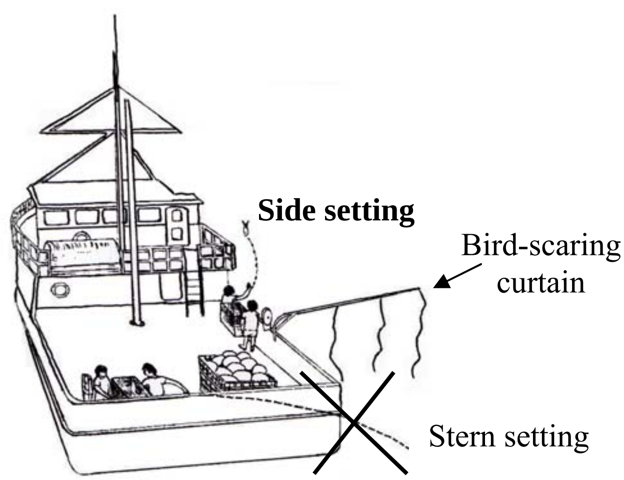


Figure 10. Proper deployment of a bird-scaring curtain when side setting.

I.A.(2). NOAA Fisheries will assess the resulting observer data on the performance of side setting and compare it with observer data and other information on the performance of night setting and thawed and blue-dyed bait in the shallow-set longline fishery and with data on the effectiveness of other seabird deterrents.

I.A.(3). Based on results of this assessment, NOAA Fisheries will develop a timeline for initial implementation and monitoring of side setting, or other equally or more effective measures to minimize the risk of incidental take of the short-tailed albatross, in the shallow-set fishery, and will submit this timeline to the Service by November 1, 2004. This timeline will project the completion of a regulatory amendment for revised seabird deterrent requirements for the entire Hawaii-based longline fishery, which will include measures developed in collaboration with the Service to minimize the risk to the short-tailed albatross. This regulatory amendment will be prepared and promulgated as regulations consistent with requirements under NEPA and the Magnuson Act.

I.A.(4). By August 30, 2005, NOAA Fisheries will implement and monitor side setting, or another appropriate seabird deterrent or combination of deterrents that the Service agrees is at least as effective as side setting in reducing the risk to the short-tailed albatross, in the shallow-set Hawaii-based longline fishery. This extended deadline provides time for NOAA Fisheries to complete review under NEPA and promulgate regulations as required to make changes in fishery management under Magnuson Act. Until new regulations are issued, the seabird deterrents currently included in the proposed action will remain in place.

<u>I.B. Additional Seabird Deterrents:</u> We recognize that some Hawaii-based longline vessels use other seabird deterrents as well as those described in the proposed action and those required under current regulations. Until new regulations for seabird deterrent use in the fishery are promulgated, as described in I.A.(4), above, vessels targeting swordfish in the Hawaii-based longline fishery therefore are not prevented from using the following deterrents <u>in addition to</u> those described in the proposed action and above:

I.B.(1). Side setting, best practiced according to specifications provided above.

I.B.(2). Line-setting machine with weighted branch lines[7]:
The longline may be set with a line-setting machine (line shooter) so that the longline is set faster than the vessel's speed.

I.B.(3). Weighted Branch Lines:
On shallow-set gear, where weighted lines are not currently required, at least 45 grams of weight may be attached to branch lines within 1 m of each baited hook.

I.B.(4). Towed Deterrents:

[7] This measure, in addition to thawed, blue-dyed bait and strategic offal discharge, is <u>required</u> for deep-set or tuna-target longline vessels operating north of 23º north latitude under the terms and conditions of the November 18, 2004 revised Opinion.

A line with suspended streamers (tori line) or a buoy that conforms to WPRFMC/NOAA Fisheries standards may be deployed when the longline is being set and hauled. Tori lines or towed deterrents should be constructed and employed according to specifications provided in Garcia and Associates (1999; Appendix A-9).

In order to implement reasonable and prudent measure II above, the following terms and conditions apply:

II.A. Annual Reporting: NOAA Fisheries will report annually the observed and estimated total number of interactions of Laysan and black-footed albatross in the shallow-set sector of the Hawaii-based longline fishery, observed take of short-tailed albatross, and any observations of short-tailed albatross. The information about interactions between only short-tailed albatross and longline gear would not provide us or NOAA Fisheries with sufficient information to gauge the effectiveness of seabird deterrent measures/devices. Therefore, to gauge the effectiveness of these seabird deterrents it is appropriate to collect data from surrogate species (*i.e.*, Laysan and black-footed albatross) that exhibit similar foraging behavior to the short-tailed albatross. NOAA Fisheries currently records observed interactions and estimates total number of interactions for these species.

In addition to reporting interactions and any take as noted above, NOAA Fisheries will evaluate the effectiveness of seabird deterrent measures implemented in the shallow-set sector of the longline fishery in reducing interactions with short-tailed albatross by measuring the rate at which Laysan and black-footed (and short-tailed, if any) albatross are caught by Hawaii-based longline vessels conducting shallow sets. NOAA Fisheries will evaluate and report on the effectiveness of the seabird deterrent regime on an annual basis.

Annual reports will be due within four months of the end of the calendar year. No later than May 1, NOAA Fisheries will report to the Service on the effectiveness of seabird deterrent measures employed in the shallow-set sector of the Hawaii-based longline fishery during the previous calendar year. The report will include (for each shallow-set trip and summarized over all shallow-set trips) all reported observations and mortalities of Laysan, black-footed, and short-tailed albatross, including date, time, location, vessel, vessel type, vessel size, gear description, total number of hooks deployed, total number of trips, and all observer or reported comments.

Annual reports will be submitted by May 1 of the year following the reporting year (*i.e.*, the report for 2004 would be submitted by May 1, 2005, etc.) to: Field Supervisor, U.S. Fish and Wildlife Service; Pacific Islands Fish and Wildlife Office; 300 Ala Moana Boulevard; Room 3-122, Box 50088; Honolulu, Hawaii 96850; telephone 808-792-9400, facsimile 808-792-9581.

An interim report on the assessment of side setting effectiveness on vessels voluntarily using this deterrent will be due November 1, 2004.

II.B. Observer Coverage: The proposed action as described includes that a NOAA Fisheries observer be placed on each longline vessel rigged to set shallow and target swordfish. That is, every Hawaii-based longline vessel leaving port to target swordfish will carry an observer. This level of coverage provides an opportunity to collect data on seabird interactions with the shallow-set fishery when the set is observed. NOAA Fisheries will vest observers aboard shallow setting Hawaii-based longline fishing vessels with responsibility for recording seabird behavior and interactions with longline gear, in addition to recording observations of other protected species. Each class/cohort of fisheries observers will be trained at NOAA Fisheries Pacific Islands Regional Office, in collaboration with Service personnel, in seabird identification and handling. NOAA Fisheries will ensure that these observers are instructed in their priority duties.

NOAA Fisheries will provide observer coverage for 100% of shallow-set longline trips made by the Hawaii-based fishery. These observers' primary duties are to observe the interactions of protected species, including seabirds, with fishery operations. Observers will monitor the first hour of each set and record seabird sightings and interactions with longline gear, unless or until darkness precludes identification of seabird species. Observers will document seabird sightings and interactions during every haulback of longline fishing gear in its entirety. Details of observer duties as they relate to seabirds are described in II.C and Appendix A-10.

If a short-tailed albatross is sighted, all observers on all vessels will record as much information as possible about the bird's appearance (*e.g.*, plumage) and behavior for as long as the bird is visible (see II.D., below).

II.C. Observer Duties[8]: On all shallow-set trips, observers will collect data on sightings and behavior of short-tailed, Laysan, and black-footed albatrosses and seabird interactions with longline gear during the first hour of setting operations, or until darkness prevents the observer from distinguishing between seabird species. In addition to monitoring the setting of longline gear for interactions with seabirds, observers will conduct two "scan counts" within five-minute windows to count and identify seabirds that are visible from the vessel: one at the beginning of the hour and another 30 minutes later (see Appendix A-10). Observers will record seabird sightings and behavior in the vicinity of longline gear throughout longline haulback operations, and conduct scan counts in five-minute windows at the top of every hour during the haul unless or until darkness precludes identification of seabird species.

Observers will record the behavior of the short-tailed albatross and other seabirds observed, including the following information, on the Protected Species Event Log and Seabird Biological Data Form (Appendices A-11 and A-12):

- the species of birds present
- whether birds attempt to strike at the gear to eat the bait
- the species of birds striking at gear (other than short-tailed albatross)
- the location of birds in relation to the longline gear
- whether birds are either hooked or injured by the gear

[8] Observers for this proposed action receive the same seabird identification and handling training as observers for the tuna fishery.

- number of birds striking at the fishing gear per set and per haulback
- the number of albatrosses of each species that are hauled back on longline gear
- whether the albatross was killed or injured during the haulback
- if albatross are recorded as injured, observers will describe the extent of the injury to the best of their ability.

In addition to the above-mentioned information, written observer reports will include:

- the date of the set
- latitude and longitude the set began and ended
- the type(s) of seabird deterrent measures used
- bait type (and whether it was frozen or thawed and dyed blue)
- amount of weight on hooks
- weather conditions (wind velocity, visibility, and sea state),
- time set began and ended
- number of hooks set
- number of birds within the vicinity of the vessel at the beginning of the set
- bird behavior before and during set
- time haulback began and ended
- latitude and longitude haulback began and ended
- the number of birds, by species, that touch the gear, and their fate and condition

In the event a short-tailed albatross is taken, the handling guidelines (Appendix A-13) will be followed.

II.D. Observations of Short-tailed Albatross: In the event a NOAA Fisheries observer sights a short-tailed albatross during a fishing trip, NOAA Fisheries will alert the Service as soon as possible and will make arrangements for the Service to interview the observer. The interview will occur within seven days of the vessel's return to port. NOAA Fisheries will make available to the Service copies of all relevant information (*e.g.*, notes and comments, pictures) collected by the observer concerning the sighting. Confidential vessel information may be withheld from release and maintained as privileged under the Freedom of Information Act.

In the event that a short-tailed albatross is taken, the observer will notify NOAA Fisheries and NOAA Fisheries will notify the Service immediately. In the event that a short-tailed albatross is either taken or sighted, a report containing all of the information described above will be transmitted to the same address within 30 days of the event or 10 days of the return of the vessel to port, whichever comes first. If a short-tailed albatross is taken, all details regarding the bird (as recorded on the short-tailed albatross recovery sheet [Appendix A-13] and the Seabird Biological Data form [Appendix A-12]) will be included in this report.

II.E. Quarterly Reports – NOAA Fisheries Observer Program: Written reports from the NOAA Fisheries observer program containing summaries of observer data on trip statistics and protected species interactions will continue to be submitted quarterly to the Service, as they are now, using the same contact information given above, under II.A., Reporting. For examples, see the quarterly reports posted on the NOAA Fisheries Pacific Islands Regional Office website:

http://swr.nmfs.noaa.gov/pir/qreports/qreports.htm . These reports are due shortly after the end of each quarter (March 31, June 30, September 30, and December 31).

In order to implement reasonable and prudent measure III above, and as incidental take is permitted for this listed species, the following terms and conditions apply:

III.A. Handling and Rehabilitation of Injured Short-tailed Albatross: NOAA Fisheries will advise fishers and observers that every reasonable effort must be made to save injured short-tailed albatross. For complete details, see Appendix A-13, Handling Guidelines for Short-tailed Albatross. If a short-tailed albatross is recovered alive, it must be retained unless it exhibits all of the following traits:

1. head is held erect and bird responds to noise and motion stimuli;
2. bird breathes without noise;
3. both wings can flap and retract to normal folded position on back; and
4. bird can stand on both feet with toes pointed in the proper direction (forward).

If a recovered albatross exhibits all of these traits, it should be held until dry and then released overboard, but we strongly recommend that NOAA Fisheries be contacted prior to release so a qualified veterinarian or seabird expert can be consulted. If the recovered bird fails to exhibit even one of the above traits, it must, by law, be retained aboard and NOAA Fisheries contacted immediately. The U.S. Coast Guard may be contacted to facilitate communication between the vessel and the NOAA Fisheries. The appropriate NOAA Fisheries personnel will be contacted at any one of the following telephone numbers (by availability, in the order listed):

Kevin Busscher	808/973-2935 extension 215
Jeremy Bisson	808/973-2935 extension 256
Joe Arceneaux	808/973-2935 extension 216

NOAA Fisheries will arrange for a qualified veterinarian or seabird expert from the list included with Appendix A-13 to contact the vessel and provide treatment, recovery, and release guidance.

III.B. Disposition of Dead Short-tailed Albatross: NOAA Fisheries will instruct observers and fishers that any dead short-tailed albatross must be retained aboard and brought back to port. Specimens must be frozen immediately, with identification tags attached directly to the carcass, and a duplicate identification tag attached to the bag or container holding the carcass. Identification tags must include all of the following information: species, date of mortality, name of vessel, location (latitude and longitude) of mortality, observer or captain's name (or both), and any band numbers and colors if the specimen has any leg bands. Leg bands must remain attached to the bird.

NOAA Fisheries will inform observers and fishers that specimens must be surrendered as soon as possible to a NOAA Fisheries or Service office. Specimens must remain frozen and must be shipped as soon as possible to: Field Supervisor, Ecological Services, Pacific Islands Office, US Fish and Wildlife Service, Room 3-122, Honolulu, Hawaii 96850. The contact numbers for the Pacific Islands Office are: telephone 808-792-9400 telephone, facsimile 808 792-9581.

III.C. Annual Workshops[9]: NOAA Fisheries will continue to conduct annual workshops to inform fishers of the risk of short-tailed albatross takes in the Hawaii-based longline fishery. At least one annual workshop will be conducted each year. The workshops will include: information exchange between NOAA Fisheries, WPRFMC, the Service, and fishers about: (1) the use of effective seabird deterrent devices in the fishery, (2) status of the short-tailed albatross population and observations of the bird in the vicinity of the Hawaii-based longline fishing area, and (3) review of albatross species identification. Translations will be provided to Vietnamese and Korean speaking fishers with regard to all educational materials distributed to vessel captains.

In the annual report, NOAA Fisheries will provide the Service with the results of the annual workshop with respect to the: (a) topics discussed (*e.g.* seabird deterrent devices/strategies), (b) list of participants, (c) date, time and location of the workshop.

III.D. Albatross Species Identification Card: Similar to the requirement for the deep-set, tuna-target fishery, NOAA Fisheries will continue to produce the plastic-coated, weatherproof, cards that illustrate albatross species (short-tailed, Laysan and black-footed) for identification purposes, and distribute them to all fishers in the shallow-set Hawaii-based longline fishing fleet. The card should be translated to the Korean and Vietnamese languages and distributed to those fishers whose first language is either Korean or Vietnamese.

Summary of Reporting Requirements

Please note that the following is only a summary and details of written reporting requirements are included in the terms and conditions above. Reporting requirements in this biological opinion may be combined with those in the November 18, 2000 revised Opinion for the tuna fishery.

1. Side setting report:
NOAA Fisheries will provide an interim report on the assessment of side setting effectiveness on vessels voluntarily using this deterrent by November 1, 2004.

2. Annual reports:
NOAA Fisheries will report annually by May 1 the total observed number of fishery interactions with Laysan, black-footed, and short-tailed albatross in the shallow-set fishery (from Term and Condition II.A).

[9] Similar reporting is required under November 18, 2002 revised Opinion for the tuna fishery, and the information from both sectors of the fishery may be compiled into a single report.

NOAA Fisheries will evaluate annually the effectiveness of all required seabird deterrent devices by measuring the rate at which Laysan, black-footed, and short-tailed albatrosses are caught by Hawaiian longline vessels, by set type (from Term and Condition II.A).

In addition to recording all albatross injured or killed during fishery operations, NOAA Fisheries observers will record sightings of all albatross species during the set and haulback of the main line (from Term and Condition II.C), and these data will be summarized in the annual report.

NOAA Fisheries will report to the Service the results of the annual workshop with respect to the: (a) topics discussed (*e.g.*, seabird deterrent devices/strategies), (b) list of participants, (c) date, time and location of the workshop (from Term and Condition I.C).

Annual reports are due within four months of the end of the calendar year, *e.g.*, for 2004, the report would be due by May 1, 2005.

3. Quarterly reports:
The NOAA Fisheries observer program will continue to send quarterly data summaries to the Service (from Term and Condition II.C.). These reports are shortly after the end of each quarter (March 31, June 30, September 30, and December 31).

4. Short-tailed albatross sightings and interactions:
In the event that a short-tailed albatross is taken, NOAA Fisheries and the Service will be notified immediately. In the event that a short-tailed albatross is either sighted or taken, NOAA Fisheries will arrange an interview by the Service of the observer within seven days of the vessel's return to port. A written report of the sighting or take will be submitted to the Service within 30 days of the event or 10 days of the return of the vessel to port, whichever comes first (from Term and Condition II.D., III.A., and III.B.). If a short-tailed albatross is taken, all details regarding the bird (as recorded on the short-tailed albatross recovery sheet; see Appendix A-13) will be included in this report.

All reports from NOAA Fisheries described above will be submitted to: Field Supervisor, U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office; 300 Ala Moana Boulevard; Room 3-122, Box 50088; Honolulu, Hawaii 96850; telephone 808 792-9400; facsimile 808 792-9580.

Table 10. Summary of reporting dates.

Report Type	Due Date
Side setting, interim	November 1, 2004
Annual	By May 1, within four months of end of calendar year
Quarterly, Observer Program	Following March 31, June 30, September 30, and December 31
Short-tailed albatross sightings and interactions	Within 30 days of the event or 10 days of vessel's return to port, whichever is soonest

VIII. Conservation Recommendations

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

To keep the Service informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of the following conservation recommendation:

(1) NOAA Fisheries should coordinate with the governments of Japan, Korea, Taiwan, and other Pacific fishing nations the collection of fishery effort and seabird injury and mortality information from fishing vessels that conduct fishery operations similar to U.S. fisheries that deploy gear such as longline and hook-and-line gear. NOAA Fisheries should collect catch per unit effort (per thousand hooks) data from these countries. If historical catch per unit effort (per thousand hooks) is accessible to NOAA Fisheries, this information should be submitted to the Service. NOAA Fisheries should also seek to obtain the rate at which seabirds are hooked per 1,000 hooks. These rates can be used to estimate the possible number of short-tailed albatross that may be hooked in these fisheries and the collective impact that longline fisheries may have on short-tailed albatross. Concerning incidental catch of short-tailed albatross, NOAA Fisheries should seek to obtain any and all records of short-tailed albatross that are accidentally caught by fishing vessels from these countries, where and how they were caught, and the disposition of the birds upon release.

(2) NOAA Fisheries should conduct a study to determine whether the circle hooks now required in the shallow-set fishery reduce hooking-related injuries to seabirds, and compare these results with hooking-related injuries to seabirds caused by "J" hooks in the Hawaii-based longline

fishery. Circle hooks are designed to hook an animal on the jaw, thus avoiding damage to internal soft tissue. If an animal hooked in this manner falls off or is brought on board to have the hook removed, and then is released, it may have a greater chance at survival. If the results of such a study indicate that circle hooks cause fewer hooking related injuries to seabirds than “J” hooks, then the Service would recommend that circle hooks be selected as the only type of hook to be used in the deep-set or tuna-target sector of the Hawaii-based longline fishery, which now uses “J” hooks.

(3) NOAA Fisheries should continue to support research into effective seabird deterrent devices and strategies that reduce risk of interaction between seabirds and Hawaii-based longline gear and fishing-related activities. For example, underwater setting chutes and capsules and lining tubes, all of which deploy gear at a depth sufficient to prevent birds from settling on hooks during the set should continue to be tested for use as seabird deterrents. NOAA Fisheries should coordinate with and communicate the results of these analyses to the Service. The Service would analyze the results of the research and determine whether results indicate a probably significant reduction in seabird interactions with longline gear in the Hawaii-based fishery. If so, then the Service may amend this biological opinion and incorporate these new seabird deterrent devices or strategies into the terms and conditions.

(4) NOAA Fisheries should investigate the rate at which Laysan and blackfooted albatross “fall off” longline gear as a result of being injured, hooked, or entangled during the set. NOAA Fisheries investigators should analyze the number of birds that may be injured, hooked, or entangled during the set and compare this amount with the number of birds that are documented injured, hooked or entangled during the haulback. Understanding the rate at which birds may “fall off”longline gear will influence the analyses that relate to estimating the number of Laysan and black-footed albatross that are killed in the Hawaii longline fishery each year. Refining these analyses will help the NOAA Fisheries and Service gauge the effectiveness of the various seabird deterrent devices and ultimately, help reduce the risk of interaction between short-tailed albatross and the Hawaii-based longline fishery.

IX. Reinitiation Notice

This concludes formal consultation on the reopened shallow-set, swordfish-target sector of the Hawaii-based longline fishery as regulated by NOAA Fisheries. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) in the event of a major population decline as a result of a natural environmental catastrophe or oil spill, in which case the effects of longline fisheries on short-tailed albatross could be seriously exacerbated; (4) agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (5) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

LITERATURE AND REFERENCES CITED

A. Literature Cited

American Ornithologists' Union. 1998. Checklist for North American birds. 7th ed. Allen Press: Lawrence, KS.

Arnoff, A.E. 1960. Some observations on birds at Torishima. Tori 15(76):269-279.

Atkinson, I.A.E. 1985. The spread of commensal species of Rattus to oceanic islands and their effects on island avifaunas. Pages 35-81 in P. J. Moors, ed. Conservation of island birds. Technical Publication No. 3, International Council for Bird Preservation, Cambridge, England.

Auman, H.J. 1994. Plastic ingestion, biomarkers of health, PCBs and DDE in two species of albatrosses on Sand Island, Midway Atoll. M.S. Thesis. Michigan State University, Department of Fisheries and Wildlife.

Austin, O.L., Jr. 1949. The status of Steller's albatross. Pacific Science 3:283-295.

Berger, A.J. 1972. Hawaiian Birdlife. University Press of Hawaii. Honolulu, HI.

Bigelow, K.A., C.H. Boggs and X. He. 1999. Environmental Effects on Swordfish and blue shark catch rates in the US North Pacific longline fishery. Fisheries Oceanography 8:3, p.178-198.

Boggs, C.H. 2001. Deterring albatrosses from contacting baits during swordfish longline sets. Pages 79-94 in Proceedings – Seabird bycatch: trends, roadblocks, and solutions. University of Alaska Sea Grant AK-SG-01-01.

_____. 2002. Annual report on the Hawaii longline fishing experiments to reduce sea turtle bycatch under ESA Section 10 permit 1303 (November 30, 2002). Honolulu Laboratory, Southwest Fisheries Science Center, National Marine Fisheries Service, Honolulu, Hawaii. 22 pp.

_____ and R. Ito. 1993. Hawaii's pelagic fisheries. Marine Fisheries Review 55(2):69-82.

Cochrane, J.F. and A.M. Starfield. 1999. A simulated assessment of incidental take effects on short-tailed albatrosses. Unpublished report to U.S. Fish and Wildlife Service. 22 pp.

Cousins, K.L. 1998. Light sticks: a marine pollution problem for breeding seabirds. A paper presented to the WPRFMC, December 1998. 19 pp.

_____ and J. Cooper. 2000. The population biology of the black-footed albatross in relation to mortality caused by longline fishing. Report of a workshop held in Honolulu, Hawaii, 8-10, October 1998 under the auspices of the WPRFMC. 120 pp.

Curran, D.S., C.H. Boggs, and X. He. 1996. Catch and effort from Hawaii's longline fishery summarized by quarters and five degree squares. NOAA Technical Memorandum NOAA-TM-NMFS-SWFSC-225, National Marine Fisheries Service. January 1996.

DeGange, A.R. 1981. The short-tailed albatross, Diomedea albatrus, its status, distribution and natural history. U.S. Fish and Wildlife Service unpubl. rep. 36pp.

DiNardo, G.T. 1999. Proceedings of the Second International Pacific Swordfish Symposium. NOAA Technical Memorandum, NMFS - SWFSC - 263.

Dollar, R.A. 1991. Summary of swordfish longline observations in Hawaii, July 1990-March 1991. Southwest Fisheries Science Center, Administrative Report H-91-09. National Marine Fisheries Service, Southwest Fisheries Science Center, Honolulu Laboratory, Honolulu, HI. June 1991.

Environment Agency, Japan. 1996. Short-tailed albatross conservation and management master plan. Environment Agency, Japan.

Fefer, S.I. 1989. Letter to Dr. Hiroshi Hasegawa, Biology Department, Toho University on April 26, from Stewart Fefer, U.S. Fish and Wildlife Service, Honolulu HI, regarding short-tailed albatross sightings on Midway Island and ingestion of plastics by birds. 2pp.

Fernandez, P., D.J. Anderson, P.R. Sievert, K.P. Huyvaert. 2001. Foraging destinations of three low-latitude albatross (Phoebastria) species. Journal of Zoology 254: 391-404.

Garcia and Associates. 1999. Final report: Hawaiian longline seabird mortality mitigation project. Prepared for Western Pacific Regional Fisheries Management Council, Honolulu, HI, September 1999. 93pp. + appendices.

Gales, R., N. Brothers, and T. Reid. 1998. Seabird mortality in the Japanese tuna longline fishery around Australia, 1988-1995. Biological Conservation 85-101.

Gilman, E., C. Boggs, N. Brothers, J. Ray, B. Woods, K. Ching, J. Cook, S. Martin, and D. Chaffey. 2002. Performance Assessment of an Underwater Setting Chute to Minimize

Seabird Mortality in the Hawaii Pelagic Longline Tuna Fishery. Draft Final Report--Peer Review Version. To be submitted to U.S. Fish and Wildlife Service in fulfillment of Endangered Species Act and Migratory Bird Treaty Act permit conditions. Honolulu, HI, USA. 54 pp.

Gilman, E., N. Brothers, D.R. Kobayashi, S. Martin, J. Cook, J. Ray, G. Ching, and B. Woods. 2003a. Performance assessment of underwater setting chutes, side setting, and blue-dyed bait to minimize seabird mortality in Hawaii longline tuna and swordfish fisheries. Final Report. National Audubon Society, Hawaii Longline Association, U.S. National Marince Fisheries Service Pacific Islands Science Center, U.S. Western Pacific Regional Fisheries Management Council, Honolulu, HI, USA. 42 pp.

Gilman, E., C.H. Boggs, and N. Brothers. 2003b. Performance assessment of an underwater setting chute to mitigate seabird bycatch in the Hawaii pelagic longline tuna fishery. Ocean and Coastal Management 46: 985-1010.

Hadden, F.C. 1941. Midway Islands. Hawaiian Planter's Record 45:179-221.

Hampton, J., K. Bigelow, and M. Labelle. 1998. A summary of current information on the biology, fisheries, and stock assessment of bigeye tuna (Thunnus obesus) in the Pacific Ocean, with recommendations for data requirements and future research. Secretariat of the Pacific Community. Oceanic Fisheries Programme Technical Report No. 36. Noumea, New Caledonia. 46 pp.

Harrison, C.S. 1979. Short-tailed albatross, vigil over Torishima Island. Oceans 12(5): 24-26.

_____, T.S. Hida and M.P. Seki. 1983. Hawaiian seabird feeding ecology. Wildlife Monographs 85:1-71.

Hasegawa, H. 1977. Status of the short-tailed albatross on Torishima in 1976/77. Pacific Seabird Group Bulletin 4(2): 13-15.

_____. 1978. Recent observations of the short-tailed albatross, Diomedea albatrus, on Torishima. Journal of the Yamashina Institute of Ornithology Miscellaneous Reports No. 1, 2 (no. 51, 52): 58-68.

_____. 1979. Status of the short-tailed albatross of Torishima and in the Senkaku Retto in 1978/79. Pacific Seabird Group Bulletin 6: 806-814.

_____. 1981. Letter of 27 July to U.S. Fish and Wildlife Service from Biology Department, Toho University, Japan. 4 pp.

_____. 1982. The breeding status of the short-tailed albatross Diomedea albatrus, on Torishima, 1979/80-1980/81. Journal of the Yamashina Institute of Ornithology 14: 16-24.

_____. 1984. Status and conservation of seabirds in Japan, with special attention to the short-tailed albatross. Pages 487-500 in Croxall, J.P.; Evans, G.H. Schreiber, R.W. (Eds.), status and conservation of the world's seabirds. International Council for Bird Preservation Technical Publication 2. Cambridge, UK.

_____. 1991. Red Data Bird: Short-tailed albatross. World Birdwatch 13: 10.

_____ and A. DeGange. 1982. The short-tailed albatross Diomedea albatrus, its status, distribution and natural history. American Birds 6: 806-814.

Hawaii Longline Association (HLA) and Western Pacific Fishery Management Council (WPRFMC). 2004. Biological assessment of the pelagics new technologies regulatory amendment. 35 pp.

He, X., K.A. Bigelow and C.H. Boggs. 1997. Cluster analysis of longline sets and fishing strategies within the Hawaii-based fishery. Fisheries Research 31: 147-158.

Hyrenbach, K.D., P. Fernandez, and D.J. Anderson. 2002. Oceanographic habitats of two sympatric North Pacific albatrosses during the breeding season. Marine Ecology - Progress Series 233: 283-301.

Ito, R.Y. and W.A. Machado. October, 1999. Annual Report of the Hawaii-based longline fishery for 1998. National Marine Fisheries Service, Southwest Fisheries Science Center, Honolulu Laboratory, Honolulu, HI. Administrative Report H-99-06. 62 pp.

Ito, R.Y. and W.A. Machado. 2001. Annual Report of the Hawaii-Based Longline Fishery for 2000. Administrative Report H-01-07, December 2001. Southwest Fisheries Science Center.

King, W.B. 1981. Endangered Birds of the World: the ICBP Bird Red Data Book. Smithsonian Institute Press and International Council for Bird Preservation, Washington, D.C. 13 pp.

Lacy, R. C. 1993. Vortex instructions. Pp. 1-31 in T. Kreeger, ed. Vortex users manual: a stochastic simulation of the extinction process. Chicago Zoological Society: Brookfield Zoo, Chicago, IL.

Leppo, J. 2004 (March 12). Letter to U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, and National Marine Fisheries Service, Pacific Islands Regional Office, from Stoel Rives, LLP.

Lynch, J. 2004 (September 3). Letter to U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, and National Marine Fisheries Service, Pacific Islands Regional Office, from Stoel Rives, LLP.

McCracken, M.L. 2001. Estimation of albatross take in the Hawaiian longline fisheries. Honolulu Laboratory, Southwest Fisheries Science Center, National Marine Fisheries Service, Honolulu, HI. 27 pp.

McDermond, D.K. and K.H. Morgan. 1993. Status and conservation of North Pacific albatrosses. Pages 70-81 in Veermeer, K., K.T. Briggs, K.H. Moran, and D. Seigel-Causey (eds.), The status, ecology, and conservation of marine birds of the North Pacific. Canadian Wildlife Service Special Publication, Ottawa.

McElderry, H., J. Schrader, D. McCullough, J. Illingworth, S. Fitzgerald, S. Davis. 2004. Electronic monitoring of seabird interactions with trawl third-wire cables on trawl vessels; a pilot study. NOAA Technical Memorandum NMFS-AFSC-147. 50 pp.

Meffe, G.K., and C.R. Carroll. 1997. Principles of Conservation Biology, 2nd Ed. Sinauer Associates, Sunderland, MA. 729 pp.

Moors, P.J. and I.A.E. Atkinson. 1984. Predation on seabirds by introduced animals, and factors affecting its severity. Pages 667-690 in Croxall, J.P., P.G.H. Evans, and R.W. Schreiber (eds.), Status and conservation of the world's seabirds, Int. Coun. Bird Preserv. Tech. Bull. No. 2, Cambridge, U.K.

National Marine Fisheries Service (NOAA Fisheries). 2003a. Annual report on seabird interactions and mitigation efforts in the Hawaii-based longline fishery for calendar years 2000 and 2001. Administrative Report AR-PIR-03-02. National Marine Fisheries Service Pacific Islands Regional Office, Honolulu, Hawaii. 43 pp.

______. 2003b. Annual report on seabird interactions and mitigation efforts in the Hawaii-based longline fishery for calendar year 2002. Administrative Report AR-PIR-03-03. National Marine Fisheries Service Pacific Islands Regional Office, Honolulu, Hawaii. 24 pp.

______. 2004a. Endangered Species Act section 7 consultation biological opinion on the proposed regulatory amendments to the fisheries management plan for the pelagic fisheries of the western Pacific region. National Marine Fisheries Service, Office of Protected Species. 252 pp.

______. 2004b. Hawaii Longline Observer Program Field Manual. Pacific Islands Regional Office, Honolulu, Hawaii.

Nunn, G.B., J. Cooper, P. Jouventin, C.J.R. Robertson, and G.G. Robertson. 1996. Evolutionary relationships among extant albatrosses (Procellariiformes: Diomedeiadae) established from complete cytochrome-B gene sequences. Auk 113: 784-801.

Olson, S.L. and P.J. Hearty. 2003. Probable extirpation of a breeding colony of short-tailed albatross (Phoebastria albatrus) on Bermuda by Pleistocene sea-level rise. Proceedings of the National Academy of Science 100: 12825-12829.

Ono, Y. 1955. The status of birds on Torishima; particularly of Steller's Albatross. Tori 14: pp. 24-32.

Palmer, R.S. 1962. Short-tailed albatross (Diomedea albatrus). Handbook of North American Birds. Vol. 1: 116-119.

Pooley, S. 2004 (March 3). Letter to U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, from National Marine Fisheries Service, Pacific Islands Regional Office.

_____. 2004 (March 25). Letter to Stoel Rives from National Marine Fisheries, Pacific Islands Regional Office.

_____. 2004 (March 29). Letter to U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, from National Marine Fisheries Service, Pacific Islands Regional Office.

_____. 2004 (May 20). Transmittal of biological assessment (prepared by Hawaii Longline Association and Western Pacific Regional Fishery Management Council) to U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, from National Marine Fisheries Service, Pacific Islands Regional Office.

Rauzon, M.J. 1985. Feral cats on Jarvis Island: their effects and their eradication. Atoll Research Bulletin No. 282.

Reed, J.M., D.D. Murphy, and P.F. Brussard. 1998. Efficacy of population viability analysis. Wildlife Society Bulletin 26: 244-251.

Richardson, S. 1994. Status of the short-tailed albatross on Midway Atoll. Elepaio 54:35-37.

Robertson, D. 1980. Rare birds of the west coast of North America. Woodcock Publications, Pacific Grove, CA. Pp. 6-9.

Robinson, W. 2004 (June 21). Letter to U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, from National Marine Fisheries Service, Pacific Islands Regional Office.

Sanger, G.A. 1972. The recent pelagic status of the Short-tailed Albatross (Diomedea albatrus). Biological Conservation 4: 189-193.

Sanger, G.A. 1974a. Black-footed albatross Diomedea nigripes. In W.B. King, ed. Pelagic studies of seabirds in the central and eastern Pacific Ocean. Smithsonian Contributions to Zoology No. 158.

Sanger, G.A. 1974b. Laysan albatross Diomedea immutabilis. In W.B. King, ed. Pelagic studies of seabirds in the central and eastern Pacific Ocean. Smithsonian Contributions to Zoology No. 158.

Sattelberg, R.M. 2004 (April 2). Letter from U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, to National Marine Fisheries Service, Pacific Islands Regional Office.

_____. 2004 (May 5). Letter from U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, to the Western Pacific Regional Fishery Management Council.

Seki, M.P., J.J. Polovina, D.R. Kobayashi, and B.C. Mundy. 1999. The oceanography of the subtropical convergence zone in the central west North Pacific and its relevancy to the Hawaii-based swordfish fishery. Presentation at the Second Meeting of the Interim Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean, Honolulu, 15-23 January 1999.

Sekora, P.C. 1977. Report of Short-tailed Albatross Diomedea albatrus from Hawaiian Islands. J. Yamashina Inst. Ornithol. Misc. Rep. 9:28.

Sherburne, P.C. 1993. Status report on the short-tailed albatross Diomedea albatrus. U.S. Fish and Wildlife Service unpublished report, Alaska Natural Heritage Program. 33 pp.

Shultz, G. 2004 (March 19). Letter from U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, to National Marine Fisheries Service, Pacific Islands Regional Office.

Sievert, P.R. 2004. A simulation model for the growth of short-tailed albatross populations on Torishima and the Senkaku Islands. Unpublished Excel model developed for the USFWS Short-tailed Albatross Recovery Team (program and output available upon request).

Sievert, P.R. and L. Sileo. 1993. The effects of ingested plastic on growth and survival of albatross chicks in Veermeer, K. et al., eds. The status, ecology and conservation of marine birds of the North Pacific. Canadian Wildlife Service Special Publication, Ottawa.

Simkin, T. and L. Siebert. 1994. Volcanoes of the world: a regional directory, gazetteer, and chronology of volcanism during the last 10,000 years. Geoscience Press, Inc. Tucson, AZ. and the Smithsonian Institution.

Simonds, K. 2004 (April 19). Letter from Western Pacific Regional Fishery Management Council to U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office.

Smith, D.G., J.T. Polhemus, and E.A. VanderWerf. 2002. Comparison of managed and unmanaged wedge-tailed shearwater colonies on O'ahu: effects of predation. Pacific Science 56: 451-457.

Taylor, R.H., G.W. Kaiser, and M.C. Draver. 2000. Eradication of Norway rats for recovery of seabird habitat on Langara Islands, British Columbia. Restoration Ecology 8:151.

Tickell, W.L.N. 1973. A visit to the breeding grounds of Steller's albatross Diomedea albatrus. Sea Swallow 23:1-3.

_____. 1975. Observations on the status of Steller's albatross (Diomedea albatrus) 1973. Bulletin of the International Council for Bird Preservation XII: 125-131.

Tramontano, J.P. 1970. Winter observations of the short-tailed albatross in the western Pacific Ocean. Condor 72(1):122.

Tuck, G.S. 1978. A field guide to the seabirds of Britain and the world. Collins Co. Ltd., London. 17pp.

Ushijima, Y., J.H. Oliver, Jr., J.E. Keirans, M. Tsurumi, Kawabata, Watanabe, and M. Fukunaga. 2003. Mitochondrial sequence variation in Carios capensis (Neumann), a parasite of seabirds, collected on Torishima Island in Japan. Journal of Parasitology 89: 196-198.

U.S. Fish and Wildlife Service (Service). 1999. Biological Opinion on the effects of hook-and-line groundfish fisheries in the Gulf of Alaska and Bering Sea/Aleutian Islands areas on short-tailed albatrosses (*Phoebastria albatrus*).

_____. 2000. Biological Opinion of the U.S. Fish and Wildlife Service on the Effects of the Hawaii-based Domestic Longline Fleet on the Short-tailed Albatross (*Phoebastria albatrus*).

_____. 2002. Final Revision of the U.S. Fish and Wildlife Service's November 28, 2000 Biological Opinion on the Effects of the Hawaii-based Domestic Longline Fleet on the Short-tailed Albatross (*Phoebastria albatrus*).

_____. 2003a. Programmatic Biological Opinion on the effects of the Fishery Management Plans (FMPs) for the Gulf of Alaska (GOA) and Bering Sea/Aleutian Islands (BSAI) groundfish fisheries on the endangered short-tailed albatross (*Phoebastria albatrus*) and threatened Steller's eider (*Polysticta stelleri*).

_____. 2003b. Endangered Species Act Formal Consultation addressing the effects of the Total Allowable Catch (TAC)-setting process for the Gulf of Alaska and Bering Sea/Aleutian Island Groundfish Fisheries on the endangered short-tailed albatross (*Phoebastria albatrus*) and threatened Steller's eider (*Polysticta stelleri*).

Western Pacific Regional Fishery Management Council (WPRFMC). March 23, 1987. Fishery management plan for pelagic fisheries of the western Pacific region. 1164 Bishop Street, Suite 1405. Honolulu, HI.

_____. November 21, 1990. Amendment 1 and environmental assessment - fishery management plan for pelagic fisheries of the western Pacific region. 1164 Bishop Street, Suite 1405. Honolulu, HI.

_____. February, 1991. Amendment 2 and environmental assessment, fishery management plan for pelagic fisheries of the western Pacific region. 1164 Bishop Street, Suite 1405. Honolulu, HI.

_____. June 4, 1991. Amendment 3, regulatory impact review and proposed regulations, fishery management plan for pelagic fisheries of the western Pacific region. 1164 Bishop Street, Suite 1405. Honolulu, HI.

_____. June, 1991. Amendment 4, extend the Hawaii longliner moratorium for a total of 3 years - environmental assessment and regulatory impact review, fishery management plan for pelagic fisheries of the western Pacific region. 1164 Bishop Street, Suite 1405. Honolulu, HI.

_____. October 7, 1991. Amendment 5, fishery management plan for pelagic fisheries of the Western Pacific region. 1164 Bishop Street, Suite 1405. Honolulu, HI.

_____. April 30, 1992. Amendment 6, fishery management plan for pelagic fisheries of the western Pacific region. 1164 Bishop Street, Suite 1405. Honolulu, HI.

_____. January 14, 1994. Amendment 7, proposed limited entry program for the Hawaiian longline fishery, fishery management plan for pelagic fisheries of the western Pacific region. 1164 Bishop Street, Suite 1405. Honolulu, HI.

_____. October 8-10, 1998. Black-footed albatross population biology workshop. 1164 Bishop Street, Suite 1405. Honolulu, HI.

_____. 1998. Pelagic fisheries of the Western Pacific region, 1997 annual report. 1164 Bishop Street, Suite 1405. Honolulu, HI.

_____. 1999. Pelagic fisheries of the Western Pacific Region, 1998 annual report. 1164 Bishop Street, Suite 1405. Honolulu, HI.

_____ . 2004. Management measures to implement new technologies for the western Pacific pelagic longline fisheries, a regulatory amendment to the fishery management plan for the pelagic fisheries of the western Pacific region, including a final supplemental environmental impact statement. 291 pp.

_____ and National Marine Fisheries Service. 2004. Appendices: management measures to implement new technologies for the western Pacific pelagic longline fisheries.

B. Personal Communications

Alvin Katekaru, National Marine Fisheries Service, Pacific Islands Fisheries Science Center, Honolulu, Hawaii, 1999, 2004

Bodeen, Tim, U.S. Fish and Wildlife Service, Midway Atoll National Wildlife Refuge, 2004

Boggs, Chris, National Marine Fisheries Service, Pacific Islands Fisheries Science Center, Honolulu, Hawaii, 1999, 2004

Busscher, Kevin, National Marine Fisheries Service, Pacific Islands Regional Office, Honolulu, Hawaii, 2004

Cook, Jim, Hawaii Longline Association, Honolulu, Hawaii, 1999

Depkin, Chris, U.S. Fish and Wildlife Service, Honolulu, Hawaii, 2004

Dieli, Robert, U.S. Fish and Wildlife Service, Midway Atoll National Wildlife Refuge, 2000

Fitzgerald, Shannon, National Marine Fisheries Service, Alaska Fisheries Science Center, Seattle, Washington, 2000

Flint, Elizabeth, U.S. Fish and Wildlife Service, Pacific/Remote Islands National Wildlife Refuge Complex, Honolulu, Hawaii, 2004

Freifeld, Holly, U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, Honolulu, Hawaii, 2004

Gore, Karla, National Marine Fisheries Service, Pacific Islands Regional Office, Honolulu, Hawaii, 2004

Graham, Tom, National Marine Fisheries Service, Pacific Islands Regional Office, Honolulu, Hawaii, 2004

Hasegawa, Hiroshi, Toho University, Chiba, Japan, 1997, 2002, 2003, 2004

Henry, Debra, U.S. Fish and Wildlife Service, Hawaiian Islands National Wildlife Refuge, 2002

Klavitter, John, U.S. Fish and Wildlife Service, Midway Atoll National Wildlife Refuge, 2004

Kobayashi, Don, National Marine Fisheries Service, Pacific Islands Fisheries Science Center, Honolulu, Hawaii, 2004

Lydon, Greg, New Zealand Seafood Industry, Wellington, New Zealand, 2004

McNamara, Brian, Garcia and Associates, Honolulu, Hawaii, 2000, 2004

Pyle, Robert, Bernice P. Bishop Museum, Honolulu, Hawaii, 2004

Robert Shallenberger, The Nature Conservancy, Kailua-Kona, Hawaii, 2004.

Sievert, Paul, University of Massachusetts, Massachusetts Cooperative Fish and Wildlife Research Unit, Amherst, Massachusetts, 2004

Suryan, Rob, Oregon State University, Department of Fisheries and Wildlife, Eugene, Oregon, 2004

Swenarton, Tom, National Marine Fisheries Service, Pacific Islands Regional Office, Honolulu, Hawaii, 2004

Swenson, Chris, U.S. Fish and Wildlife Service, Honolulu, Hawaii, 2004

Trust, Kim, U.S. Fish and Wildlife Service, Alaska Regional Office, Anchorage, Alaska, 2003

Van Fossen, Lewis, National Marine Fisheries Service, Pacific Islands Regional Office, Honolulu, Hawaii, 1999

VanderWerf, Eric, U.S. Fish and Wildlife Service, Honolulu, Hawaii, 2004

Zaun, Brenda, U.S. Fish and Wildlife Service, Kilauea, Hawaii, 2004

APPENDICES

Figure 13. Longline billfish catches in the SPC Statistical Area, 1962-1997. Source: SPC and NMFS, HL.

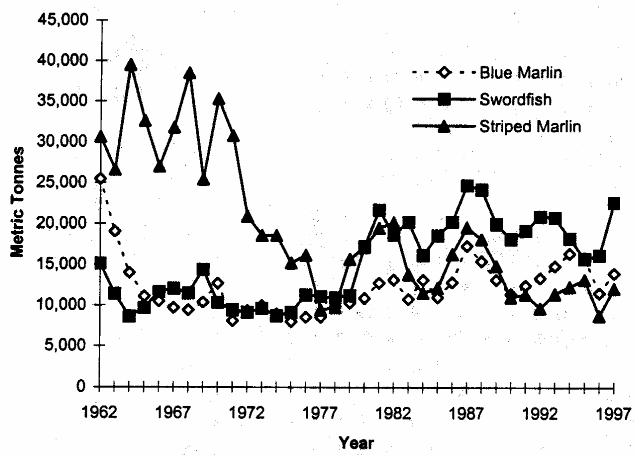
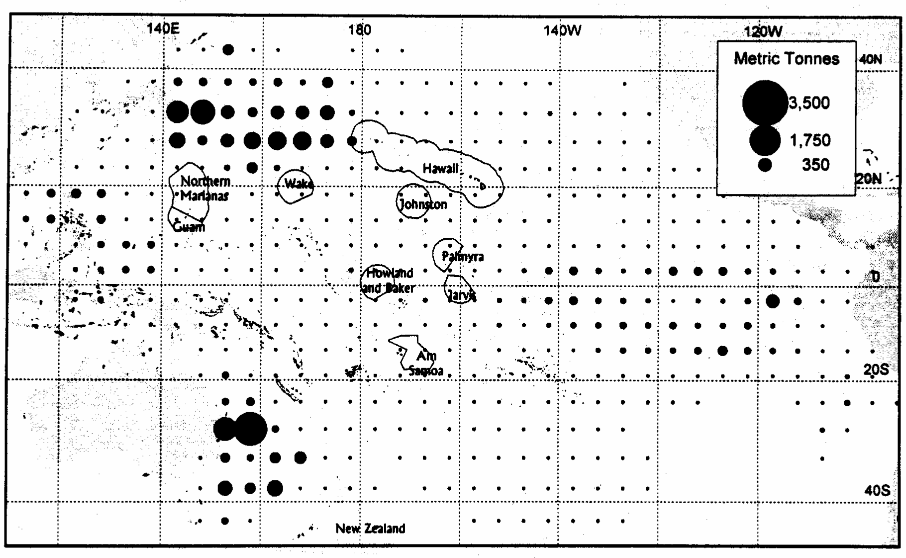


Figure 14. Distribution of longline catches of swordfish in 1997 between 40° S and 40° N, by 5° geographic square.



JAPANESE LONGLINE VESSEL CATCHES OF SWORDFISH - Distant Water Fleet
Source - 1998 Annual Report "Pelagic Fisheries of the Western Pacific Region" December, 1999-Western Pacific Regional Fishery Management Council (Honolulu, HI)(Fig.13 and 14).

Figure 7. Longline tuna catches between 40° S and 40° N, 1962-1997. Source: SPC and NMFS, HL.

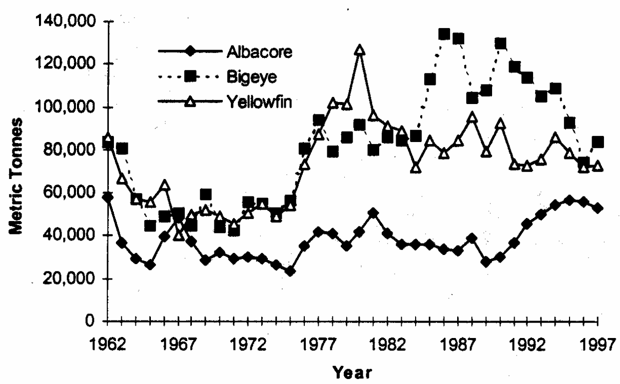
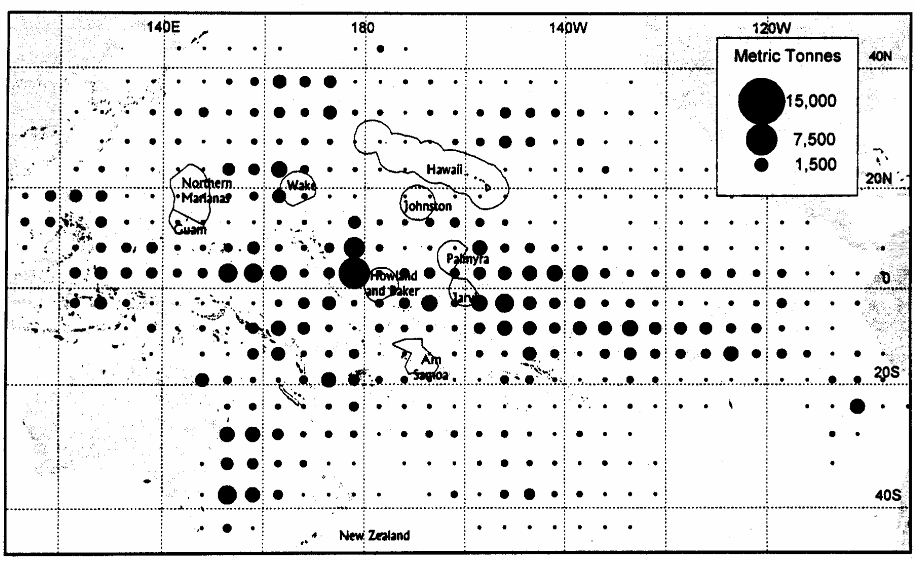


Figure 8. Distribution of longline catches of all tuna species in 1997 between 40° S and 40° N, by 5° geographic square.



JAPANESE LONGLINE VESSEL CATCHES OF TUNA- Distant Water Fleet

Source - 1998 Annual Report "Pelagic Fisheries of the Western Pacific Region" December, 1999-Western Pacific Regional Fishery Management Council (Honolulu, HI).

Table 2. Swordfish catch (metric tons) by gear type in the Pacific Ocean.

Year	Offshore and distant water longline	Coastal LL	Driftnet	Harpoon	Others	Total
1980	8,913	824	1,746	398	72	11,953
1981	10,301	675	1,848	129	125	13,078
1982	8,957	839	1,257	195	102	11,350
1983	10,272	955	1,033	166	85	12,511
1984	9,529	1,141	1,053	117	147	11,987
1985	11,607	980	1,133	191	98	14,009
1986	11,721	960	1,264	123	133	14,201
1987	12,814	819	1,051	87	97	14,868
1988	13,394	665	1,234	173	40	15,506
1989	9,633	752	1,596	362	41	12,384
1990	9,432	690	1,027	128	15	11,292
1991	8,453	799	498	153	33	9,936
1992	8,654	1,181	887	381	22	11,125
1993	12,125	1,394	292	309	48	14,168
1994	11,053	1,357	421	308	40	13,179
1995	10,120	NA	NA	NA	NA	NA

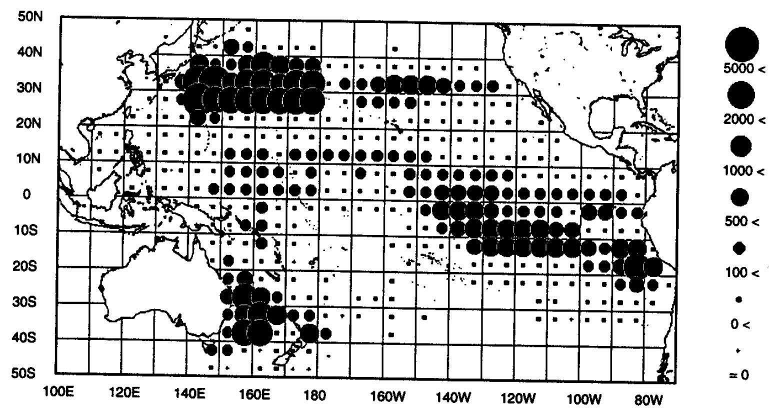


Figure 1. Geographic distribution of mean swordfish catch (thousand fish per year) of the Japanese longline fishery in the 1990s.

JAPANESE LONGLINE CATCHES OF SWORDFISH- Distant and Coastal Fleets
Source - Proceedings of the Second International Pacific Swordfish Symposium, NOAA Technical Memorandum NMFS, (NOAA-TM-NMFS-SWFSC-263), Edited by Gerard T. DiNardo, June 1999.

APPENDIX A-3

)
1
1
,
l

Table 4. Japanese longline effort (hooks) in the western-central (WCPO) and eastern Pacific Ocean (EPO). EPO statistics are from the IATTC (1997).

	Japanese longline effort (hooks)		
Year	WCPO	EPO	Total
1980	222,381,200	138,140,800	360,522,000
1981	241,908,400	131,275,104	373,183,504
1982	224,574,300	116,199,848	340,774,148
1983	197,720,200	127,176,160	324,896,360
1984	202,896,900	119,635,456	322,532,356
1985	211,479,200	106,757,808	318,237,008
1986	183,896,700	160,552,528	344,449,228
1987	193,584,100	188,392,544	381,976,644
1988	213,026,100	182,694,224	395,720,324
1989	197,725,900	170,373,088	368,098,988
1990	182,776,300	178,419,456	361,195,756
1991	174,895,000	200,364,704	375,259,704
1992	156,768,800	191,283,709	348,052,509
1993	170,586,400	159,955,430	330,541,830
1994	163,249,300	163,976,027	327,225,327
1995	150,761,600	125,145,630	275,907,230
1996	144,444,800	125,000,000	269,444,800

JAPANESE LONGLINE VESSELS "HOOKS SET" (FROM 1980 - 1996)

Source - Secretariat of the Pacific Community "A Summary of Current Information on the Biology, Fisheries, and Stock Assessment of Bigeye Tuna (*Thunnus obesus*) in the Pacific Ocean, With Recommendations for Data Requirements and Future Research" - J. Hampton, K. Bigelow, and Marc Labelle. Oceanic Fisheries Programme Technical Report No. 36, Noumea, New Caledonia. 1998.

BIRD/LONGLINE INTERACTION FORM

Date ~~02~~ 03/28/97 Bird line deployed? yes____ no ✓

Observer KLC

Weather conditions: wind velocity —windy ✓ visibility good-

precipitation yes___ no ✓ sea state overcast

swell height 20ft

Time set began 03:09 ended 03:57

Latitude-Longitude set began 30.27.058 °N 153.42.785 °W ended 30.27.210 °N 153.36.657 °W

Number of hooks set 150 hooks

Bait type ½ live milkfish / ½ Squid Frozen or thawed thawed

Amount of weight on hooks 60 grams

Number of birds within 200 meters of vessel at beginning of set (by species)

No Birds

Behavior before and during setting

Time haulback began 08:04 ended 09:21

Latitude-Longitude haulback began 30.28.070 °N 153.43.570 °W ended 30.28.822 °N 153.37.952 °W

List of birds touching gear in any way and their fate and condition
(species)(hooked, entangled, or struck?) (location of hook) (condition of bird - dead, alive and injured, alive and apparently unharmed)

1 Shorttail Albatross Adult flying by haul back

30+ Blackfooted Albatross

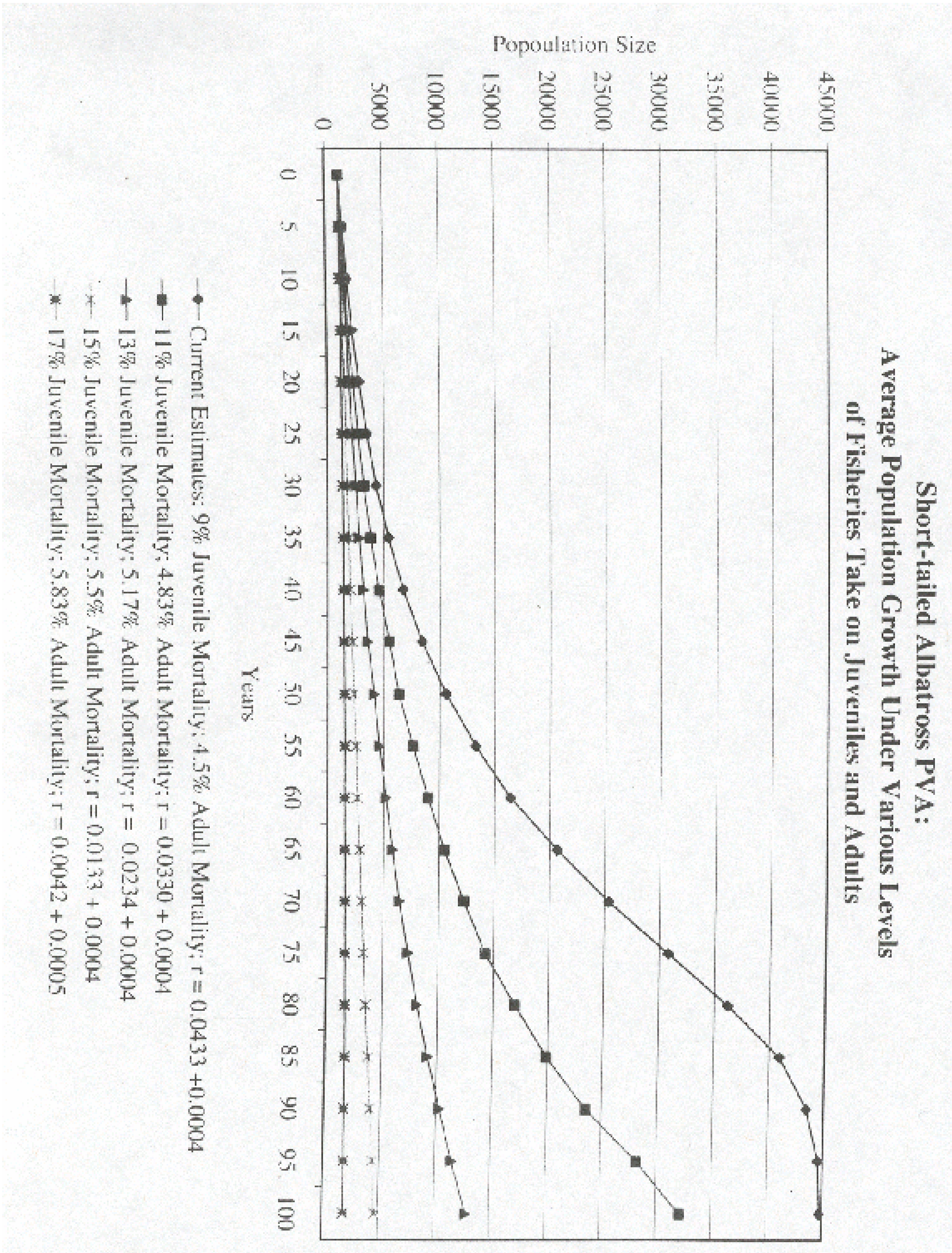
1 Laysan Albatross

Shorttail was actively looking for bait on hooks in haul back

Information about catch - species composition, ⊖

number caught ⊖

APPENDIX A-5


Short-tailed Albatross PVA:
Average Population Growth Under Various Levels
of Fisheries Take on Juveniles and Adults
Popoulation Size
0
5000
10000
15000
20000
25000
30000
35000
40000
45000
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100
Years
Current Estimates: 9% Juvenile Mortality; 4.5% Adult Mortality; r = 0.0433 +0.0004
11% Juvenile Mortality; 4.83% Adult Mortality; r = 0.0330 + 0.0004
13% Juvenile Mortality; 5.17% Adult Mortality; r = 0.0234 + 0.0004
15% Juvenile Mortality; 5.5% Adult Mortality; r = 0.0133 + 0.0004
17% Juvenile Mortality; 5.83% Adult Mortality; r = 0.0042 + 0.0005

APPENDIX A-6

Short-tailed albatross life table (from Cochrane and Starfield 1999)

	Survivorship	Number Surviving to Age X	Prop. Surv. Age X	Average Years Lived Age X to Age X+1	Life Expectancy at Age X	Expected Age at Death
Fledged	0.940	100	1.000	0.970	25.05	25.05
1	0.940	94	0.940	0.912	25.62	26.62
2	0.940	88	0.884	0.857	26.23	28.23
3	0.940	83	0.831	0.806	26.87	29.87
4	0.940	78	0.781	0.757	27.55	31.55
5	0.940	73	0.734	0.712	28.28	33.28
6	0.980	72	0.690	0.683	29.05	35.05
7	0.980	70	0.676	0.669	28.63	35.63
8	0.980	69	0.663	0.656	28.21	36.21
9	0.980	68	0.649	0.643	27.77	36.77
10	0.980	66	0.636	0.630	27.33	37.33
11	0.980	65	0.624	0.617	26.88	37.88
12	0.980	64	0.611	0.605	26.42	38.42
13	0.980	62	0.599	0.593	25.94	38.94
14	0.980	61	0.587	0.581	25.46	39.46
15	0.980	60	0.575	0.569	24.97	39.97
16	0.980	59	0.564	0.558	24.47	40.47
17	0.980	58	0.552	0.547	23.96	40.96
18	0.980	56	0.541	0.536	23.44	41.44
19	0.980	55	0.531	0.525	22.91	41.91
20	0.980	54	0.520	0.515	22.37	42.37
21	0.980	53	0.510	0.504	21.81	42.81
22	0.980	52	0.499	0.494	21.25	43.25
23	0.980	51	0.489	0.484	20.67	43.67
24	0.980	50	0.480	0.475	20.08	44.08
25	0.980	49	0.470	0.465	19.48	44.48
26	0.980	48	0.461	0.456	18.87	44.87
27	0.980	47	0.451	0.447	18.24	45.24
28	0.980	46	0.442	0.438	17.61	45.61
29	0.980	45	0.433	0.429	16.95	45.95
30	0.980	44	0.425	0.421	16.29	46.29
31	0.980	43	0.416	0.412	15.61	46.61
32	0.980	43	0.408	0.404	14.92	46.92
33	0.980	42	0.400	0.396	14.22	47.22
34	0.980	41	0.392	0.388	13.50	47.50

	Survivorship	Number Surviving to Age X	Prop. Surv. Age X	Average Years Lived Age X to Age X+1	Life Expectancy at Age X	Expected Age at Death
Fledged						
35	0.980	40	0.384	0.380	12.76	47.76
36	0.980	39	0.376	0.373	12.01	48.01
37	0.980	38	0.369	0.365	11.25	48.25
38	0.980	38	0.361	0.358	10.47	48.47
39	0.980	37	0.354	0.351	9.67	48.67
40	0.980	36	0.347	0.344	8.86	48.86
41	0.980	35	0.340	0.337	8.03	49.03
42	0.980	35	0.333	0.330	7.18	49.18
43	0.980	34	0.327	0.323	6.32	49.32
44	0.980	33	0.320	0.317	5.43	49.43
45	0.980	33	0.314	0.311	4.54	49.54
46	0.980	32	0.307	0.304	3.62	49.62
47	0.980	31	0.301	0.298	2.68	49.68
48	0.980	31	0.295	0.292	1.73	49.73
49	0.250	8	0.289	0.181	0.75	49.75
50	0.010	0	0.072	0.037	0.51	50.51

APPENDIX A-7, continued.

Modeled lost productivity, based on the loss of one four-year-old albatross (from Cochrane and Starfield 1999).

	Expected Natural Deaths	Lost Juvenile Bird Years	Discou. Lost Juv. Bird Years	Number of Lost Progeny	Lost Progeny Bird Yrs. Disc. Life	Discou. Lost Progeny Bird Years	Discou. Total Lost Bird Years
Fledged							
1							
2							
3							
4	0.060	0.940	0.913				0.913
5	0.056	0.884	0.833				0.833
6	0.018	0.866	0.792	0.182	2.629	2.406	3.199
7	0.017	0.849	0.754	0.179	2.577	2.289	3.043
8	0.017	0.832	0.717	0.175	2.525	2.178	2.896
9	0.017	0.815	0.683	0.172	2.475	2.073	2.755
10	0.016	0.799	0.649	0.168	2.425	1.972	2.621
11	0.016	0.783	0.618	0.165	2.377	1.876	2.494
12	0.016	0.767	0.588	0.162	2.329	1.785	2.373
13	0.015	0.752	0.559	0.158	2.283	1.698	2.258
14	0.015	0.737	0.532	0.155	2.237	1.616	2.148
15	0.015	0.722	0.506	0.152	2.192	1.538	2.044
16	0.014	0.708	0.482	0.149	2.148	1.463	1.945
17	0.014	0.693	0.458	0.146	2.105	1.392	1.850
18	0.014	0.680	0.436	0.143	2.063	1.324	1.760
19	0.014	0.666	0.415	0.140	2.022	1.260	1.675
20	0.013	0.653	0.395	0.137	1.982	1.199	1.594
21	0.013	0.640	0.376	0.135	1.942	1.141	1.516
22	0.013	0.627	0.357	0.132	1.903	1.085	1.443
23	0.013	0.614	0.340	0.129	1.865	1.033	1.373
24	0.012	0.602	0.324	0.127	1.828	0.982	1.306
25	0.012	0.590	0.308	0.124	1.791	0.935	1.243
26	0.012	0.578	0.293	0.122	1.755	0.889	1.182
27	0.012	0.567	0.279	0.119	1.720	0.846	1.125
28	0.011	0.555	0.265	0.117	1.686	0.805	1.070
29	0.011	0.544	0.252	0.115	1.652	0.766	1.018
30	0.011	0.533	0.240	0.112	1.619	0.729	0.969
31	0.011	0.523	0.228	0.110	1.587	0.694	0.922

	Expected Natural Deaths	Lost Juvenile Bird Years	Discou. Lost Juv. Bird Years	Number of Lost Progeny	Lost Progeny Bird Yrs. Disc. Life	Discou. Lost Progeny Bird Years	Discou. Total Lost Bird Years
Fledged							
32	0.010	0.512	0.217	0.108	1.555	0.660	0.877
33	0.010	0.502	0.207	0.106	1.524	0.628	0.835
34	0.010	0.492	0.197	0.104	1.493	0.597	0.794
35	0.010	0.482	0.187	0.102	1.464	0.568	0.756
36	0.010	0.472	0.178	0.099	1.434	0.541	0.719
37	0.009	0.463	0.169	0.097	1.406	0.515	0.684
38	0.009	0.454	0.161	0.096	1.377	0.490	0.651
39	0.009	0.445	0.153	0.094	1.350	0.466	0.619
40	0.009	0.436	0.146	0.092	1.323	0.443	0.589
41	0.009	0.427	0.139	0.090	1.296	0.422	0.561
42	0.009	0.418	0.132	0.088	1.271	0.401	0.533
43	0.008	0.410	0.126	0.086	1.245	0.382	0.507
44	0.008	0.402	0.120	0.085	1.220	0.363	0.483
45	0.008	0.394	0.114	0.083	1.196	0.346	0.459
46	0.008	0.386	0.108	0.081	1.172	0.329	0.437
47	0.008	0.378	0.103	0.080	1.148	0.313	0.416
48	0.008	0.371	0.098	0.078	1.125	0.298	0.396
49	0.278	0.093	0.024	0.020	0.281	0.072	0.096
50	0.092	0.001	0.000	0.000	0.003	0.001	0.001
Total	**0.999**	**27.051**	**16.173**	**5.313**	**76.602**	**43.807**	**59.980**

APPENDIX A-8, continued.

FINAL REPORT

Hawaii Longline Seabird

Mortality Mitigation Project

Prepared for:

Western Pacific Regional Fisheries Management Council
(WESPAC)
1164 Bishop St., Suite 1400
Honolulu, HI 96813

Prepared by:

Brian McNamara
Laura Torre
Dr. Gail Kaaialii

of
Garcia and Associates (GANDA)
729B Emily St.
Honolulu, HI 96813

September 1999

APPENDIX A-9

4.0 FIELD RESEARCH

A total of five seabird bycatch mitigation research trips of approximately thirty days duration were conducted on Hawaii pelagic longline vessels. One trip was on a tuna vessel (employing a mainline shooter) targeting bigeye tuna. Four trips were on swordfish vessels (no mainline shooter) using swordfish gear to target swordfish and/or bigeye tuna. Seabird behavioral observation data were collected during daylight hours. Tori lines, towed buoy systems, modified offal discarding practices, blue-dyed baits, night setting (swordfish vessels only) and control tests were conducted during commercial longline fishing operations. Data on effects of night setting on mortalities were collected based on seabirds found dead during hauls because seabird observations could not be made at night. Multi-variate factors relating to environmental conditions and gear variation between vessels were recorded on field data forms and considered in final analyses. Research aims and objectives for each mitigation technique and gear are listed below.

4.1 Mitigation Measure Descriptions and Usage

This study tested mitigation techniques and gears that deter seabirds from interacting with the gear by either: 1) frightening seabirds away from baited hooks, or 2) reducing attraction or visibility of baited hooks. Tori lines and towed buoy systems scare seabirds away from the area where baited hooks first enter the water. Blue-dyed baits, no offal discards, strategic offal discards, and night setting serve to reduce visibility of baited hooks or attraction to the vessel.

Adaptation and modification of mitigation measures and gear were carried out on each trip to adjust to individual vessels, and to improve the effectiveness and decrease the intrusiveness of these measures on fishing operations.

4.1.1 Tori Line. Tori lines were designed for Japanese longline tuna vessels and function to deter seabirds by having streamers fluttering in the air close enough to the surface to keep the seabirds from flying under them (Brothers 1995). The tori line system tested during this project was a modified Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) version (CCAMLR 1993; see Appendix C). The tori line was attached to a sturdy fiberglass pole (tori pole) that secured near the stern of the vessel on a swiveling steel base. The base was placed atop the setting house or shelter deck on the stern of the vessel (Plate 7) approximately 2 m from the stern and 2 m inboard of the gunwale. The height of the attachment point above water ranged from 4.5–7.2 m.

The tori line varied from 140–175 m long depending on the length of the Zone of Opportunity established for the individual vessel. It was made of 1/4-inch, three-strand poly line, and had six detachable aerial streamers. The aerial streamers were made of flexible material that moved freely and unpredictably and were designed to be long enough so they dangled just above the water's surface. The portion of the tori line that trailed in the water had short (10–25 cm) plastic water streamers. The tori line incorporated a 1/2-inch hollow braid poly drogue section at the terminal end rather than a terminal buoy. The drogue reduced entanglements with fishing gear that crossed the tori line. To achieve full effectiveness, the researcher tried to assure that the tori line was positioned directly above

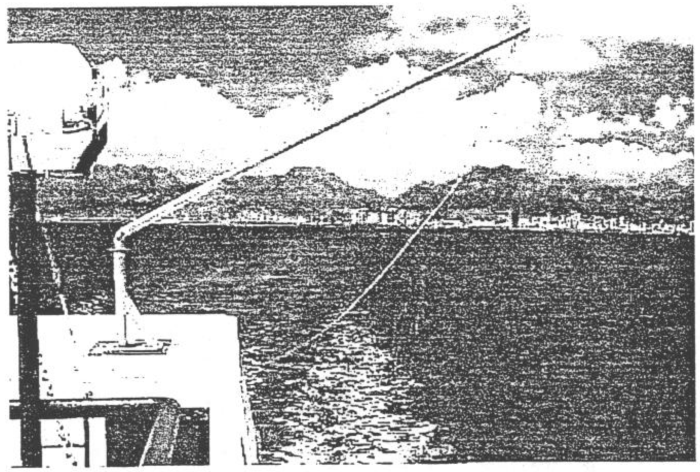


Plate 7a. Tori line and pole: the pole and swivelling steel base were mounted on top of the baitshack.

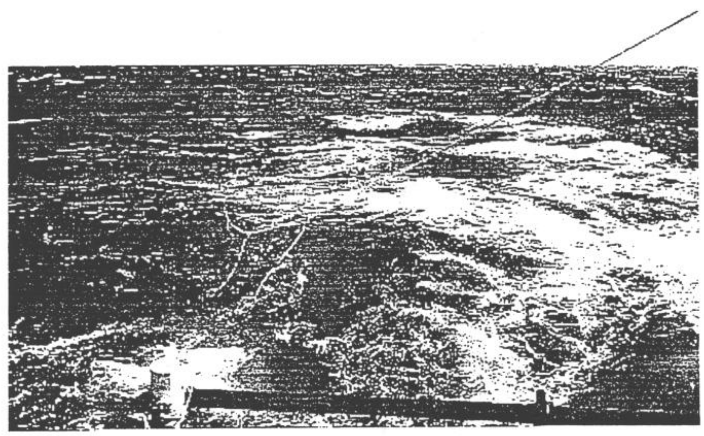


Plate 7b. Tori line deployed on the haul. Note: albatross have landed behind aerial streamer portion.

APPENDIX A-9, continued.

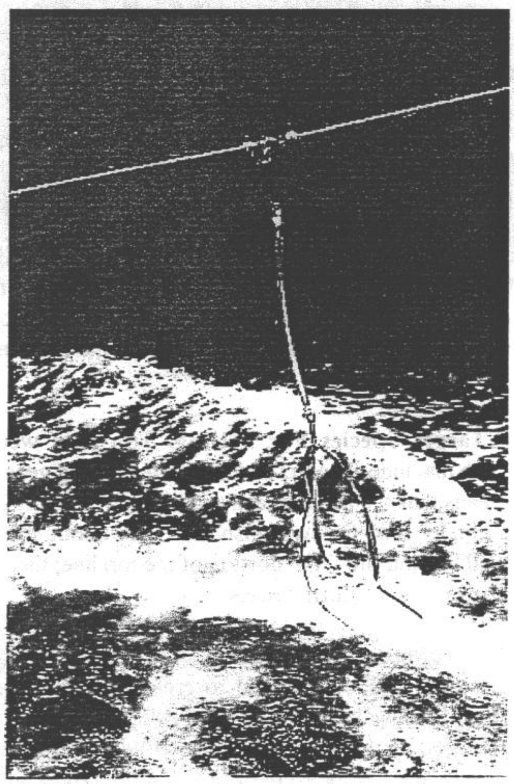


Plate 7c. Aerial streamer of graduated lengths were attached to the tori line (following page). See Appendix C for construction instructions.

APPENDIX A-9, continued.

the area where the baited hooks were deployed. The height of the attachment point, length of the tori line, and weight of the aerial streamers determined the distance that the aerial streamer portion remained aloft behind the vessel (see Appendix C).

Procedure for Setting. Prior to deployment of the tori line, the researcher and the captain of the vessel determined the wind direction relative to the vessel's setting course. The researcher positioned the tori pole so that the aerial portion of the tori line would best cover the area where baited hooks entered the water, while assuring that the terminal end would not cross the mainline or entangle suspender floats. The first radio buoy of the fishing gear was then deployed. Either the researcher or a crewman would then throw the tori line drogue overboard so that the tori line would then trail out behind the vessel. When the tori line was fully deployed and aerial streamers were up, the crew began setting the baited hooks. The baited hooks were thrown outside the vessel wake and under the protection of the aerial streamers. The researcher and the crew had to continually monitor the tori line for positioning, possible entanglements with fishing gear, and effects of sea state and weather.

Procedure for Hauling. During hauling operations, the tori pole was positioned so that the aerial streamers and terminal buoy best covered the area that baited hooks were brought near to or trailed on the waters surface. The position of the tori line was closely monitored because vessels slow, stop, back up, and turn repeatedly during hauls. This was found to be the best time to make adjustments to the pole positioning.

Modifications by Vessel/Target Species For Setting. Tori lines were designed for setting operations on tuna vessels with mainline shooters and associated fishing gear. The resulting increased sink rate of baited hooks means that the aerial streamer portion of the tori line on these vessels can usually cover the hooks until they sink. On swordfish vessels (without shooters), baited hooks are available near the surface well beyond the aerial portion of the tori line; therefore, the tori lines were made up to 35 m longer for use on swordfish vessels.

Modifications by Vessel/Target Species For Hauling. During hauls, the tori line was shortened to approximately 50 m, and a terminal buoy attached to create enough tension to keep the aerial streamers aloft. This was done because the Zone of Opportunity is much shorter during hauls, and the vessels stop and back up frequently. The aerial portion needs to cover only the distance the branchlines extend behind the boat (usually 20 m or less). In this study, only four shortened aerial streamers were used to cover the area where baited hooks trail on the surface during the haul.

4.1.2 Towed Buoy System. This technique works on the same principal as the tori line. It was expected that a towed streamer line with one or more buoys would be more effective than the tori line for two reasons: 1) tension on the tow line created by the buoy increases the distance that the aerial streamer portion remains aloft behind the vessel, and 2) the bouncing and splashing of the buoy distracts the seabirds. In most cases, the tow line was attached to the same base and pole used for the tori line. The tow lines tested varied from 140–175 m long. Tow lines were tested in two formats: 1) with one buoy at the terminal end; and 2) with two buoys, one at the midpoint and one at the terminal end (Plate 8). The use of a second buoy at the mid-point was abandoned after several breakdowns caused by the middle buoy submerging under swells and creating too much drag on the towing pole. Permanent 1-m-long plastic strap aerial streamers were incorporated in the buoy towing

APPENDIX A-9, continued.

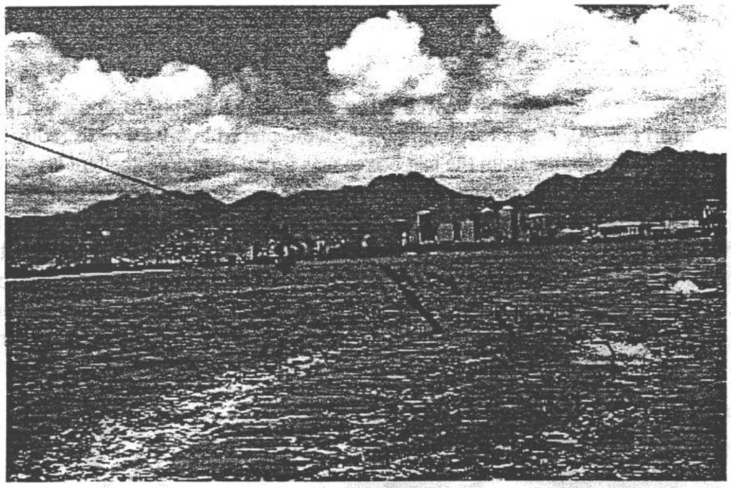


Plate 8a. Towed buoy system being deployed.

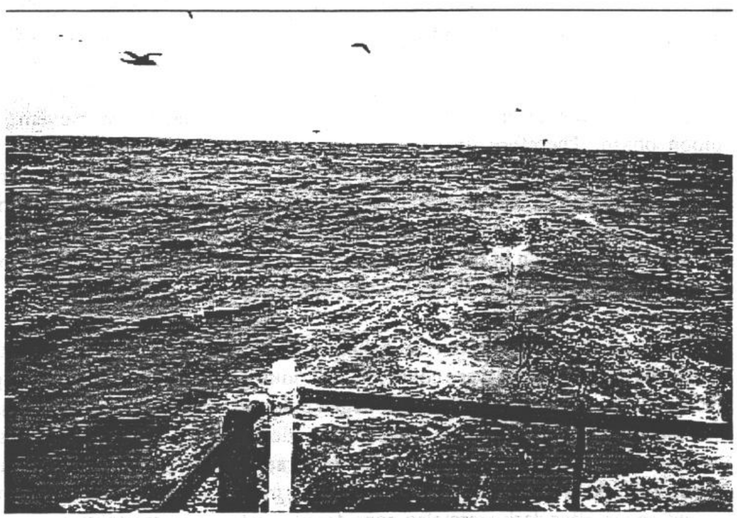


Plate 8b. Towed buoy system with one terminal buoy deployed during gear haul.

APPENDIX A-9, continued.

line to increase effectiveness (CCAMLR 1993; Appendix C). This system also incorporates 1/4-m-long plastic strap water streamers.

Mitigation Measure Construction. Towed buoy systems are simple to construct and use less hardware than a tori line. As with a tori line, swivels were placed every 20 m to reduce twisting in the towing line. Plastic strapping from the bait boxes was found to make excellent streamers and did not wrap around the towing line to the same extent as the longer tori line streamers. The plastic streamers were simply woven through the towing line at 1-m intervals. Attaching another buoy to the towing line was found to significantly increase the distance the aerial portion remains aloft behind the vessel and added another bouncing, splashing deterrent to frighten seabirds. This became problematic in large swells and or rough weather as the forward buoy would submerge and put too much tension on the towing pole. Materials needed for construction are essentially the same as for tori lines.

Procedure for Setting. See tori line procedure.

Procedure for Hauling. See tori line procedure.

Modifications by Vessel/Target Species. Just as the tori line was designed to best cover the Zone of Opportunity for each vessel, the towed buoy system was designed taking into account the distance behind the vessel that baited hooks are available to seabirds. The towed buoy system line was lengthened by up to 35 m to cover the extended Zone of Opportunity for swordfish vessels.

APPENDIX A-9, continued.

Hawaii Longline Observer Program

Observer Field Manual

Pacific Islands Regional Office

3 June 2004
(updated 7 Sep 04)

Manual Version: LM.04.06.03

Pacific Islands Region
National Marine Fisheries Service
National Oceanic and Atmosphere Administration
United States Department of Commerce

APPENDIX A-10

Special Notice For Recording Seabird Sighting Data

(these instructions do not cover sea turtle or marine mammal sightings)

During the Haul

Seabird Sightings During the Haul:
During haulback operations, record seabird sightings by doing a "Scan Count". You will do a Scan Count once an hour, at the top of the hour; after the haul has started. For example, if a haul starts at 7:55am, you would do your first Scan Count for that haul at 8:00am. If the haul started at 8:00am, you would do your first Scan Count for that haul at 9:00am.

A Scan Count is performed by doing a 360° look around the vessel from your observation post to determine the species and number of seabirds. Do this during the first five minutes of the hour, and only count the seabirds you are able to identify. If any seabirds are too far away for you to identify, don't count them. Do not spend more than five minutes scanning for seabirds. Make a sketch, if needed, to aid with difficult identifications.

After you've done a scan count for seabirds, you only need to record the following data elements on the PSEL.

Data for the Scan Counts:
-Date and the start and end times
-Group/Individual ID and Event Type Code (S)
-Activity of the vessel (and set number, if appropriate)
-Sighting method and weather code
-The species observed and their numbers

Each species observed during a scan count is recorded on a line, and assigned to the same Group ID number. In the case there are more than one species observed, you will only need to record the start time and date for the first line. Each Group ID recorded from a scan count requires only one End Event line.

►If no birds are seen during a scan count; you still need to record the data. Use the species code aVE. The number of birds will be recorded as "zero" (0). If you see birds after you've completed a scan count, even 1 minute later, do not record them as being observed during the scan count. They weren't there when you did the scan count.

Seabird Interactions During the Haul:
All observed incidents of seabirds observed making contact (incl. becoming hooked or entangled) with the gear should be recorded on the PSEL as completely and as soon as possible.
Observed incidents of seabirds making obvious attempts (*i.e.* unsuccessful dives on baited hooks or captured fish) should be recorded on the PSEL as completely as possible.

During the Set

Seabird Sightings During the Set:
During setting operations, you will observe for seabird interactions for one hour (1 hr) after the start of the set. Do two scan counts during the hour. Do the first scan count at the beginning of the set and the second at 30 minutes into the set.*

Data for the Scan Counts:
-Date and the start and end times
-Group/Individual ID and Event Type Code (S)
-Activity of the vessel (and set number, if appropriate)
-Sighting method and weather code
-The species observed and their numbers

Seabird Interactions During the Set:
All observed incidents of seabirds observed making contact (incl. becoming hooked or entangled) with the gear should be recorded on the PSEL as completely and as soon as possible. It may be difficult to determine the exact number of birds involved in an interaction. Try to determine as best you can given the local conditions, an estimate of the numbers of individuals involved in any observed interaction.♠

Observed incidents of seabirds making obvious attempts (*i.e.* unsuccessful dives on baited hooks) should be recorded on the PSEL as completely as possible. It may be difficult to determine the exact number of birds making attempts. Try to determine as best you can, given the local conditions, an estimate of the numbers of individuals making attempts.♠

During the setting of the longline, seabirds that are observed injured (hooked or entangled) or killed should be recorded on the PSEL.

If it becomes too dark to identify or count seabirds that may be present before the hour is up; stop observing and record the time you stopped observing.

*The reason that a final count at the end of the hour was not requested is that when vessels set their gear after sunset the ambient light may be insufficient to obtain reasonably accurate identifications and numbers of any seabirds following the vessel.

♠Obtaining accurate counts of sea birds involved in interactions with fishing gear may present difficulties to field workers. The NMFS and USFWS are aware of the realities of the situation. The presence or absence of interactions is very important in assessing the efficacy of seabird bycatch mitigation techniques. Even imprecise estimates of the numbers of individuals are useful when documenting the frequency at which seabird interactions occur and any associated time and location factors.

Under ideal circumstances, even experienced field workers attempting to accurately quantify seabird numbers during fishing operations would hard pressed to capture data as precise as what one would desire.

APPENDIX A-10, continued.

Observer ID

DOC/NOAA Fisheries
Pacific Islands Region
Longline Observer Program

Trip No.

Protected Species Page No.

Protected Species Event Log

Write ***PSI comments*** and ***PSI Identifying Characteristics*** for specific Protected Species Event Log records in the Comments Log.

Page No.	Line No.	Event No.	Day	Month	Year	Hour	Minute	Group/Individual ID	Event Type Code	Vess. Activity Code	Set No.	Sighting Method	Degree	Minute	Direction N/S	Degree	Minute	Direction E/W	Weather Code	Species English Name Abbr.	Species Code	Behavior Code	Condition Code	Low Estimate	Best Estimate	High Estimate	Sketch Drawn ?	Photo Taken ?	Comment Written?	Form Code	Page No.	Line No.
			Event Date/Time										Latitude			Longitude								Species Count			✓	✓	✓	Association		
	1													.			.										☐	☐	☐			
	2													.			.										☐	☐	☐			
	3													.			.										☐	☐	☐			
	4													.			.										☐	☐	☐			
	5													.			.										☐	☐	☐			
	6													.			.										☐	☐	☐			
	7													.			.										☐	☐	☐			
	8													.			.										☐	☐	☐			
	9													.			.										☐	☐	☐			
	10													.			.										☐	☐	☐			

Event Type Codes
- B Behavior
- A Approach
- C Contact
- X Event Ended

Vessel Activity Codes
- 01 Gear Retrieval
- 02 Gear Set
- 03 Gear Drift/Float
- 04 Pre-Set Preparation
- 05 Post Haul Clean-up
- 06 Running
- 07 Other

Sighting Method Codes
- 00 Not determined
- 01 Sighted with naked eye
- 02 Sighted with binoculars
- 03 Sighted by capt./crew, then Observer
- 04 Sighted by capt. or crew only
- 09 Other

Weather Codes
- 00 Not determined
- 01 Clear
- 02 Partly cloudy
- 03 Layers of clouds
- 04 Drizzle
- 05 Showers
- 06 Rain
- 07 Thunderstorms
- 08 Rain and fog
- 09 Fog/thick haze
- 10 Snow, rain/snow mix
- 99 Other

Most Common Protected Species

Code	*English Name*	*Abbr.*
dNG	Black-Footed Albatross	
dIM	Laysan Albatross	
aVE	Birds	
CC	Loggerhead Sea Turtle	
LV	Olive Ridley Sea Turtle	
DC	Leatherback Sea Turtle	
CM	Green Sea Turtle	
UH	Hard Shell Sea Turtles	
PC	False Killer Whale	
GG	Risso's Dolphin	
GM	Shortfinned Pilot Whale	
UW	Whales/Dolphins/Porpoises	
TT	Bottlenose Dolphin	
MN	Humpback Whale	

Behavior Codes
- 01 Physical contact w/gear
- 02 Attempt, no contact
- 03 Near gear, within 50 m
- 04 Near gear, 51 to 150 m
- 05 Feeding on catch
- 06 Porpoising
- 07 Bow riding
- 08 Breaching
- 09 Swimming at surface
- 10 Milling
- 11 Motionless at surface
- 12 Vessel avoidance
- 13 Vessel attraction
- 99 Other

Condition Codes
- 01 Unknown
- 02 Alive, not injured
- 03 Injured
- 04 Killed
- 05 Dead, fresh
- 06 Decomposed

form v. PS.04.06

APPENDIX A-11

Observer ID

DOC/NOAA Fisheries
Pacific Islands Region
Longline Observer Program

Protected Species Comments

From front of this form: Trip No. | Page No.

Line	Comments (Precede each comment with the appropriate line number. Use as many lines as needed.)

form v. PS.04.06.Back

APPENDIX A-11, continued.

Observer ID

DOC/NOAA Fisheries
Pacific Islands Region
Longline Observer Program

Trip No.

Set No.

Seabird Biological Data Form

Species Code

Most common species:

DIM	Laysan Albatross
DNG	Blackfoot Albatross
DAL	Short-tail Albatross
DSP	Unidentified Alb.
AOT	Other Albatross

Photo? ✓
Specimen? ✓
Sketch? ✓
Tag? ✓
Comment? ✓ (Enter comments on back of this form.)

Catch Form Page No.
Catch Form Line No.

Capture

Date/Time: Day, Month, Year 2 0, Hour, Minute

Latitude: Deg., Decimal Min. ., N/S

Longitude: Deg., Decimal Min. ., E/W

Landed ? ✓

Tags Present? Y Yes / N No / U Unk.

Release

Date/Time: Day, Month, Year 2 0, Hour, Minute

Latitude: Deg., Decimal Min. ., N/S

Longitude: Deg., Decimal Min. ., E/W

Disposition 0

01 Previously dead
02 Relsd. unharmed
03 Relsd. injured
04 Killed accidentally
05 Escaped
06 Treated as catch
07 Other
08 Unknown

Hooking/Entanglement

Hooked ? Y Yes / N No / U Unknown

Entangled ?

Hook Location 0

Entangle Location 0

01 Ingested (in esophagus)
02 Head/Beak
03 Wing
04 Body
05 Unknown
06 Tail
07 Leg/Foot

How Gear Removed

00 Unknown
01 Fell from gear, point unknown
02 Fell from gear, while in water.
03 Fell from gear, once out of water.
04 Fell from gear, by force of roller.
05 Removal req. cutting gear/animal
06 Removal with no cutting.
07 Foul hooked, cut from gear.
08 Foul hooked, removed from gear
10 Bird caught-gangion on line
11 Bird caught-gangion not on line
99 Other

Remaining Gear

X None
H Hook
L Line
B Both Hook and Line

Describe hook or line and length left on animal:

Morphology

Bill Color 0

01 Dark gray-black
02 Buff-cream/pink-gray
03 Bright pink

Mantle Color 0

01 Dark gray-black
02 Solid brown
03 White/light back

Head Color 0

01 Dark gray
02 White with dark lores
03 White

Tip of bill is a different color from the rest of the bill. ✓

Light Device

Complete only if light devices were used and the light device type has been indicated on the gear configuration form.

Color

01 Blue	06 Yellow	11 Red
02 Green	07 Magenta	12 Orange
03 Black	08 Mixed	13 Silver/Metal
04 Pink	09 Other	
05 White	10 Clear	

Proximity 0

00 On this branch line
01 Light is 1 branch line away
02 Light is 2 branch lines away
03 Light is 3 branch lines away
04 None in vicinity

form v. SB.04.06

APPENDIX A-12

DOC/NOAA Fisheries
Pacific Islands Region
Longline Observer Program

Observer ID

From front of this form

Trip No.

Page No.

Catch Form Page No.

Catch Form Line No.

Seabird Biological Data Form Comments

Comments:

Injuries Description:

Identifying Characteristics:

form v. SB.04.06.Back

APPENDIX A-12, continued.

APPENDIX A-13: Handling & Release Guidelines for Short-tailed Albatross Hooked or Entangled in the Hawaiian Longline Fishery

I. SAFETY ISSUES:

A. Personal Protective Equipment

1. Gloves
2. Safety Glasses (if available)
3. Long Sleeves

B. Safe Handling Techniques

1. Prior to handling bird, set up a cardboard box in a quiet, well-ventilated area. Place one beach towel on inside bottom of box for cushioning.
2. Working in teams of two, put on gloves and use a clean towel or blanket to cover the bird to protect its feathers from fish oil and handling damage. For maximum safety for the bird (and you), always hold the head with one hand and tuck the bird under your other arm. When holding the head, never wrap your hand completely around the neck (you could suffocate the bird). Rather, the back of the bird's head should be against the palm of your hand and your fingers should have a firm grasp at the base of the skull or bill.
3. Keep the bird's bill away from you and your partner's face and bare skin (try to hold the bird at hip-level or below for handler's safety).

C. Safety Concerns

1. Bills - sharp tips and edges can cause scratches, cuts, and crushing bites. Keep the bill away from the face and bare skin.
   a. Maintain control of head, hold back of head and not the bill, do not block the nares (nasal openings).
   b. Cover the bird's eyes to calm it down.
   c. Wear gloves
   d. Keep the bill away from face and exposed skin
2. Wings - can cause painful bruising
   a. Fold naturally and gently to body to avoid injury to bird's bones, muscles, and tendons
   b. Cover and restrain with a sheet or towel, do not hold too tightly as the bird needs to naturally move breast to breathe
3. Feet - nails can cause scratches and cuts
   a. Wear gloves and long sleeves
   b. Cover bird's feet with sheet or towel to control movement.

II. CAPTURE AND HANDLING:

A. Albatross Sighting and Vessel Control

1. Fishers scan main line as far ahead as possible in order to sight albatross in advance. This scanning reduces the possibility of the albatross being jerked out of the water.
2. Do not get ahead of the main line while picking up gear to reduce the chance of fouling or running over gear and albatross.
3. Upon sighting the albatross: STOP VESSEL and PUT IN NEUTRAL.
4. Retrieve leader with albatross slowly, keeping a gentle, consistent tension on the line. Avoid tugging or yanking line quickly.
5. Ensure that enough slack or play is left in the line to keep the albatross near the vessel yet in the water until it can be determined when you can safely bring the bird on board.
6. If the bird is flying, gently pull bird on board and try not to further entangle bird in line.

B. Retrieval of Albatross from Water

1. If vessel is equipped with "cut-out doors," use this area to bring albatross aboard to minimize the distance from the water.
2. Lift bird on board using a long handled dip net. DO NOT USE LEADER LINE, GAFFS, OR SHARP OBJECTS to retrieve the albatross.
3. Support the bird's body weight when removing from water, do not pull on bird's neck.

C. Handling Guidelines

1. Review Safety Issues
2. Upon retrieval of bird onto vessel, cover bird with a towel or sheet to calm bird and reduce risk of injury to handler and bird.
3. Gain control of head.
   a. Hold head and not bill.
   b. Do not block the nares (nasal openings)
4. Gently remove bird from net
   a. One person untangles bird's wings, bill, and feet from net while second person keeps bird covered and controls bird's head.
5. Restrain bird with a clean towel.
   a. Ensure wings and legs are folded to body naturally.
   b. Do not hold too tightly to prevent injury and to ensure movement of breast necessary for proper breathing.
   c. Do NOT hold by soft tissue, such as neck.
6. Cover bird's eyes to calm bird.
7. Try to hold bird no higher than hip-level for handler's safety.
8. Prevent bird's feathers from becoming dirty with oils or other products as this affects bird's waterproofing, body temperature control, and ability to fly.

III. ASSESS BIRD'S CONDITION:

A. ***Assess bird's condition***

1. After retrieving bird from water and removing from dip net, place bird on deck in a safe area and observe bird prior to handling further.
2. Determine if bird is dead or alive. A dead bird will be unresponsive to surroundings, unable to stand, have no blink reflex, and will not be breathing.

B. ***Dead Albatross Procedures***

1. Record relevant information on data sheet and bird figures (e.g., band numbers, date, time, location, wounds, hooks, etc.)
2. Attach identification tag directly to the carcass, and attach a duplicate identification tag to the bag or container holding the carcass. Tags should be filled out in pencil or waterproof ink. Immediately place carcass in freezer. Identification tags should include the following information: species, date of mortality, location (latitude and longitude) of mortality, trip number, sample number, and any band numbers if the bird has a leg band. Leg bands, hooks, and line must remain attached to the bird.
3. Immediately contact one of the following National Marine Fisheries Service (NOAA Fisheries) personnel at the following numbers (by availability, in the order listed). The U.S. Coast Guard or the U.S. Fish and Wildlife Service's (USFWS) French Frigate Shoals station may be contacted to facilitate communication between the vessel and NOAA Fisheries if unable to contact NOAA Fisheries directly.

   National Marine Fisheries Service

   Joe Arceneaux   Work: 808-973-2935 extension 216
   Fax: 808-973-2941
   E-mail: Stuart.Arceneaux@noaa.gov

   Kevin Busscher   Work: 808-973-2935 extension 215
   Fax: 808-973-2941
   E-mail: kevin.busscher@noaa.gov

   U.S. Coast Guard - Point Reyes, California, Radiotelephone, Continuous Watch

   Call Sign: NMC

Daytime ITU Channel	Ship Transmits (kHz)	Shore Transmits (kHz)

816	08240.0	08764.0
1205	12242.0	13089.0
Nighttime ITU Channel	Ship Transmits (kHz)	Shore Transmits (kHz)
424	04134.0	04426.0
601	06200.0	06501.0

U.S. Fish and Wildlife Service, French Frigate Shoals
Contact Frequency: 10054.0
Call Signs: KOJ638 Tern Island or KOJ639 Honolulu

4. Dead birds must be surrendered, as soon as possible following return to port, to a NOAA Fisheries or USFWS office. Birds can be returned to ports on the following islands: Midway, Kauai, Oahu, Maui, and Hawaii.

C. Living Albatross Procedures

1. Observation Checklist - complete the following observations and record I nformation on data sheet prior to handling bird further:
   a. Can the bird stand and hold head upright?
   b. Is the bird alert, responsive, aware of surroundings (i.e., does it snap at you or otherwise react to you when approached)?
   c. Are the eyes open?
   d. Does the bird breathe with its bill closed (i.e., no open bill breathing)?
   e. Does the bird breathe quietly (i.e., no sounds)?
   f. Is the bird holding its wings in a normal position up and against the body (i.e., not drooping)?
   g. Can the bird flap its wings?
   h. Is the bird free from visible damage? (If damaged, the wounds should be noted on bird figures)
   i. Is the bird free of hooks and fishing line? (If bird is hooked or entangled in line, note location on bird figures)
   j. Is the bird banded? If yes, record the band number on the data sheet.
2. Immediately contact appropriate personnel at the following numbers (by availability, in the order listed). The U.S. Coast Guard or the USFWS French Frigate Shoals station may be contacted to facilitate communication between the vessel and NOAA Fisheries.

National Marine Fisheries Service

Joe Arceneaux	Work:	808-973-2935 extension 216
	Fax:	808-973-2941
	E-mail:	Stuart.Arceneaux@noaa.gov
Kevin Busscher	Work:	808-973-2935 extension 215
	Fax:	808-973-2941
	E-mail:	kevin.busscher@noaa.gov

U.S. Coast Guard - Point Reyes, California, Radiotelephone, Continuous Watch

Call Sign: NMC

Daytime ITU Channel	Ship Transmits (kHz)	Shore Transmits (kHz)
816	08240.0	08764.0
1205	12242.0	13089.0
Nighttime ITU Channel	Ship Transmits (kHz)	Shore Transmits (kHz)
424	04134.0	04426.0
601	06200.0	06501.0

U.S. Fish and Wildlife Service, French Frigate Shoals
Contact Frequency: 10054.0
Call Signs: KOJ638 Tern Island or KOJ639 Honolulu

NOAA Fisheries will arrange for a qualified veterinarian or seabird expert to contact the vessel and provide treatment, recovery, and release guidance.

3. If all observation checklist questions can be answered “yes”, the bird is releaseable. However, it is strongly recommended that the NOAA Fisheries be contacted prior to release so a qualified veterinarian or seabird expert can be consulted. All Release Guidelines should be followed.

IV. TREATMENT

A. General Treatment Guidelines:

1. If the bird does not meet the release criteria, it should be held on board for a minimum of 24 hours while the captain/observer repeatedly attempts to contact NOAA Fisheries personnel.
2. Following contact by the vessel, NOAA Fisheries will arrange for a qualified veterinarian/seabird expert to contact the vessel and relay care and treatment procedures.
3. With the exception of removing entangled lines, do NOT treat, release, or euthanize bird unless directed to do so by a qualified seabird expert or veterinarian.
4. If you have any doubts about removing objects, wait until able to discuss with a veterinarian or seabird expert.
5. If the captain/observer is unable to contact NOAA Fisheries personnel within 24 hours, then follow guidelines for hook removal under the Recovery Section.

B. Entanglement in Lines

1. Hold bird following Handling Guidelines.
2. Do NOT tug on line.
3. Using bandage scissors, cut line as close as possible to hook.

C. Assess Hooking

1. Note location of hook on bird figures.
2. Determine degree of hooking (light, medium, or deep - see figure of hooking)
   a. <u>Light Hooking</u>: hook is clearly visible and caught in bill, leg, webbing of feet, or wing.
   b. <u>Medium Hooking</u>: hook is located in mouth or throat.
   c. <u>Deep Hooking</u>: hook has been swallowed and is located inside the body below the neck.

V. RECOVERY

A. Recovery Area

1. Place a cardboard box with ventilation holes in a quiet, well-ventilated area. Place one beach towel on inside bottom of box for cushioning.
2. Do NOT place bird in a hot or exposed area such as the engine room, near an exhaust stack, or in an exposed area on deck
3. Following assessment of condition and treatment, gently place bird in box and cover open top of box with a beach towel to calm the bird.
4. Do NOT provide food or water.

B. Observation Period

1. Observe bird, being careful not to place face within striking distance of bill, at 30 minutes, 1 hour, and periodically thereafter. Note condition on data sheet. Observations should be minimized to prevent disturbance to the bird.
2. Follow veterinarian/seabird expert instructions for care and treatment of bird.

C. Hook Removal

1. Light Hooking:
   a. Make repeated attempts to contact NOAA Fisheries for a minimum of 24 hours. If contacted, follow veterinarian/seabird expert instructions.
   b. If unable to contact NOAA Fisheries after repeated attempts within a 24 hour period, then follow these procedures:
      1) Remove hook by using bolt cutters to pare the hook barb and then thread the hook out backwards.
      2) Allow the bird to dry, drying may take anywhere from 1 to 4 hours.
      3) Release bird ONLY if it meets all release criteria. Follow release guidelines.
      4) If bird does not meet release criteria, continue to hold bird and contact NOAA Fisheries.
2. Medium Hooking:
   a. Make repeated attempts to contact NOAA Fisheries for a minimum of 48 hours. If contacted, follow veterinarian/seabird expert instructions.
   b. If unable to contact NOAA Fisheries after repeated attempts within a 48 hour period, then follow these procedures:
      1) Remove hook - If possible, remove hook by using bolt cutters to pare the hook barb and then thread the hook out backwards. If the hook is located in such a way that prevents paring the barb, cut the line as close to the eye of hook as possible and push the hook out barb first. Observe wound sight for bleeding. Allow the bird to dry, drying may take anywhere from 1 to 4 hours. Release bird only if it meets all release criteria. Follow release guidelines. If the bird does not meet release criteria, continue to hold bird and contact NOAA Fisheries.
      2) Release bird ONLY if it meets all release criteria. Follow release guidelines.
      3) If bird does not meet release criteria, continue to hold bird and contact NOAA Fisheries.
3. Deep Hooking:

a. Deeply hooked birds will not survive at sea and must be brought in for veterinary care. If a bird is deeply hooked, contact NOAA Fisheries immediately and return to port (Midway, Kauai, Oahu, Maui, or Hawaii) as directed by a veterinarian for transfer to NOAA Fisheries or USFWS personnel or their authorized representative.

VI. RELEASE GUIDELINES:

A. Release Criteria

1. Do NOT release dead birds. These birds should be frozen and transferred to a NOAA Fisheries, USFWS, or other authorized representative.
2. Every effort should be made to contact NOAA Fisheries prior to releasing a live bird.
3. Birds must meet all of the following criteria prior to release:
   - a. Head is held erect and bird responds to noise and motion stimuli;
   - b. Bird breathes without noise;
   - c. Both wings can flap and retract to a normal folded position on back;
   - d. Bird can stand on both feet with toes pointed in the proper direction (forward); and
   - e. No evidence of hooks, lines, or wounds on birds with the exception of those areas where hooks or lines have been removed prior to release (hooks and line entanglement should be noted on the short-tailed albatross figures).
4. Bird's feathers must be dry prior to release. Drying time may take from ½ to 4 hours.
5. Data sheets should be completed prior to release.
6. Photographs of the bird prior to and during release are recommended.

B. Release Method

1. STOP VESSEL and place in neutral.
2. Ease albatross gently onto the water, through cut-out door if so equipped.
3. Observe that the albatross is safely away from the vessel before engaging the propeller and continuing operations.
4. Note date, time, location, and behavior of albatross on data forms.

TOOLBOX:

It is recommended that each vessel have the following items on board for handling hooked or entangled albatross:

1. Cardboard Box (open top measuring approximately 4'x4'x4' [minimum size 3'x3'x3'] with ventilation holes on all sides)

2. Bandage Scissors for removing fishing line
3. Large Plastic Bags
4. Beach Towels (4)
5. Tags
6. Record-keeping forms
7. Gloves
8. Bolt Cutters
9. Knife
10. Safety Glasses (optional)
11. Camera (optional)
12. Pencils
13. Waterproof pen (optional)

Veterinarian & Seabird Expert Contacts for Short-tailed Albatross Hooked or Entangled in the Hawaiian Longline Fishery

contact in the following order:

1. ***Thierry Work DVM***
   USGS-BRD National Wildlife Health Research Center
   Hawaii Field Station
   P.O. Box 50167
   Honolulu, HI 96850
   Work: 808-541-3445
   Fax: 808-541-3472
   E-mail: thierry_work@usgs.gov

2. ***Linda Elliot***
   International Bird Rescue & Research Center (IBRRC)
   Hawaii Office: 808-884-5576
   Main Office in California: 707-207-0380
   After Hours Cell Phone: 707-249-4870
   E-mail: IBRRCHI@aol.com

3. ***Doug Chang DVM***
   Aloha Animal Hospital
   4224 Waialae Ave.
   Honolulu, HI 96816
   Work: 808-734-2242
   E-mail: alohavet@aol.com

4. ***Ben Okimoto DVM***
   Honolulu Zoo
   151 Kapahulu Ave.

Honolulu, HI 96815
Work: 808-971-7180
E-mail: hnzoovet@hgea.org

5. ***Gregg Levine DVM***
Sea Life Park Hawaii
41-202 Kalanianaole Highway
Waimanalo, HI 96795
Work: 808-259-2535
Fax: 808-259-7373
E-mail: glevinedvm@aol.com

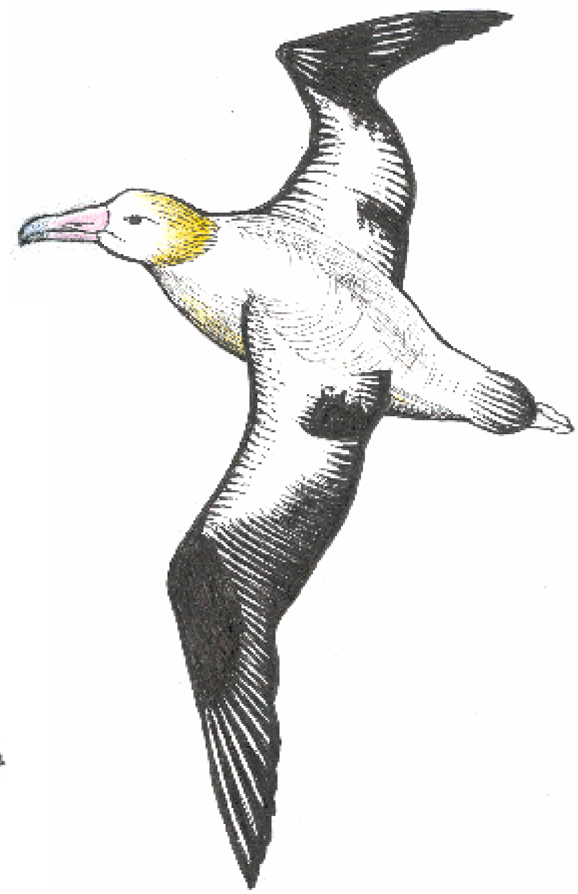
6. ***Beth Flint***
U.S. Fish and Wildlife Service
Pacific/Remote Islands National Wildlife Refuge Complex
300 Ala Moana Blvd., Rm. 5-231
PO Box 50167
Honolulu, HI 96850
Work: 808-792-9553
Fax: 808-792-9586
E-mail: Beth_Flint@fws.gov

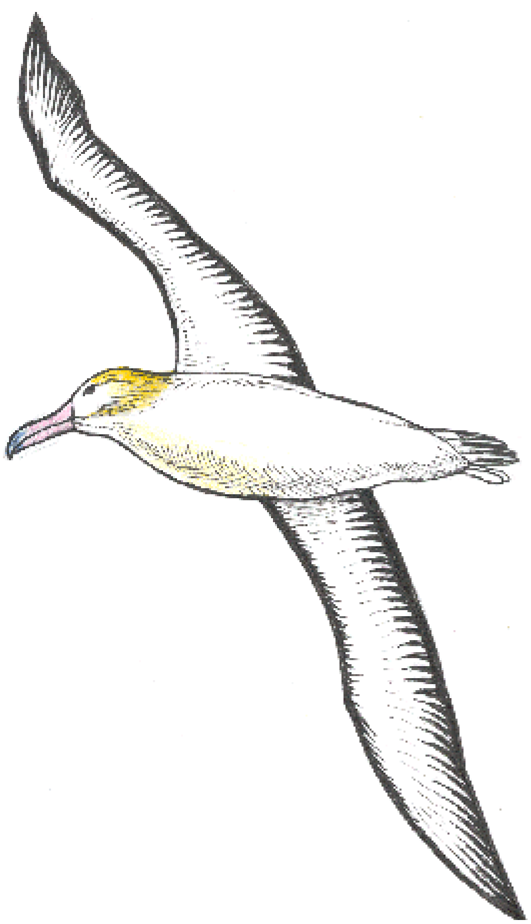
7. ***Eric VanderWerf***
U.S. Fish and Wildlife Service
Pacific Islands Fish and Wildlife Office
300 Ala Moana Blvd., Rm. 3-122
PO Box 50088
Honolulu, HI 96850
Work: 808-792-9400
Fax: 808-792-9581
E-mail: Eric_Vanderwerf@fws.gov

8. ***Holly Freifeld***
U.S. Fish and Wildlife Service
Pacific Islands Fish and Wildlife Office
300 Ala Moana Blvd., Rm. 3-122
PO Box 50088
Honolulu, HI 96850
Work: 808-792-9400
Fax: 808-792-9581
E-mail: Holly_Freifeld@fws.gov

Short-tailed Albatross

Figures for Noting Wounds, Hooks, and Lines
(circle impacted area and provide description)

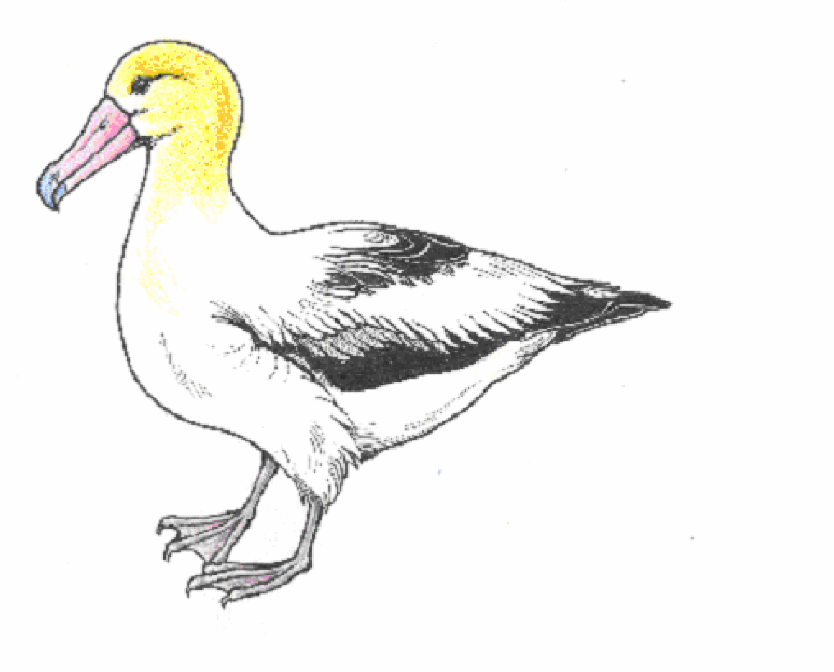


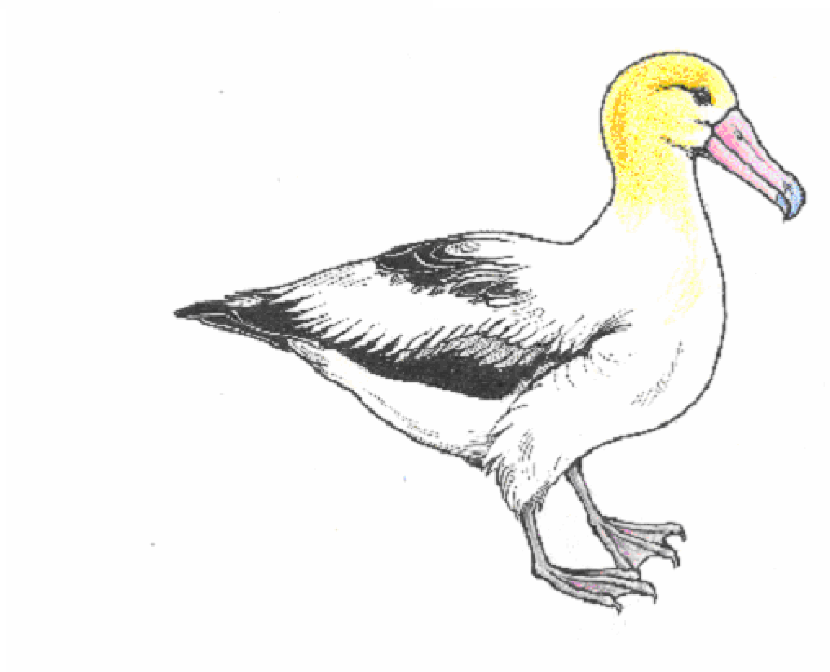


Drawings by Ronald L. Walker

Short-tailed Albatross

Left and Right Side Figures for Noting Wounds, Hooks, and Lines
(circle impacted area and provide description)





Drawings by Ronald L. Walker

an exempted fishing permit request, exempted fishing permit report, or scientific research activity report; and 30 minutes for an exempted educational activity request or an exempted educational activity report.

Estimated Total Annual Burden Hours: 695.

Estimated Total Annual Cost to Public: $14,797.

IV. Request for Comments

Comments are invited on: (a) Whether the proposed collection of information is necessary for the proper performance of the functions of the agency, including whether the information shall have practical utility; (b) the accuracy of the agency's estimate of the burden (including hours and cost) of the proposed collection of information; (c) ways to enhance the quality, utility, and clarity of the information to be collected; and (d) ways to minimize the burden of the collection of information on respondents, including through the use of automated collection techniques or other forms of information technology.

Comments submitted in response to this notice will be summarized and/or included in the request for OMB approval of this information collection; they also will become a matter of public record.

Dated: March 16, 2005.

Gwellnar Banks,

Management Analyst, Office of the Chief Information Officer.

[FR Doc. 05–5524 Filed 3–18–05; 8:45 am]

BILLING CODE 3510–22–P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

Proposed Information Collection; Comment Request; Socio-economic Assessment of Marine Protected Areas Management Preferences

AGENCY: National Oceanic and Atmospheric Administration (NOAA).

ACTION: Notice.

SUMMARY: The Department of Commerce, as part of its continuing effort to reduce paperwork and respondent burden, invites the general public and other Federal agencies to take this opportunity to comment on proposed and/or continuing information collections, as required by the Paperwork Reduction Act of 1995.

DATES: Written comments must be submitted on or before May 20, 2005.

ADDRESSES: Direct all written comments to Diana Hynek, Departmental Paperwork Clearance Officer, Department of Commerce, Room 6625, 14th and Constitution Avenue, NW., Washington, DC 20230 (or via the Internet at *dHynek@doc.gov*).

FOR FURTHER INFORMATION CONTACT: Requests for additional information or copies of the information collection instrument and instructions should be directed to Juan Agar, (305) 361–4218 or *Juan.Agar@noaa.gov.*

SUPPLEMENTARY INFORMATION:

I. Abstract

The National Marine Fisheries Service proposes to conduct a survey to collect socio-economic data to strengthen the management, protection, and conservation of existing and proposed Marine Protected Areas (MPAs) in the U.S. Caribbean (Puerto Rico and U.S. Virgin Islands). MPAs are any area of the marine environment that has been reserved by Federal, State, territorial, tribal, or local laws or regulations to provide lasting protection for part or all of the natural and cultural resources therein. The survey intends to collect demographic, cultural, and economic information from communities that are dependent on the estuarine and marine resources for their livelihood. The proposed data collection is necessary to develop science-based criteria and protocols to identify and evaluate the economic impacts of management decisions. The information will be used to protect the sustainable use of estuarine and marine ecosystems for present and future generations. The information collected will also be used to satisfy legal mandates under Executive Order 13158, the Magnuson-Stevens Fishery Conservation Act, the National Marine Sanctuaries Act, the National Wildlife Refuge Administration Act, the Coastal Zone Management Act, the National Environmental Policy Act, and other pertinent statues.

II. Method of Collection

The socio-economic information will be collected via personal interviews and mail surveys.

III. Data

OMB Number: 0648–0494.

Form Number: None.

Type of Review: Regular submission.

Affected Public: Business and other for-profit organizations.

Estimated Number of Respondents: 700.

Estimated Time Per Response: 1 hour.

Estimated Total Annual Burden Hours: 700.

Estimated Total Annual Cost to Public: $0.

IV. Request for Comments

Comments are invited on: (a) Whether the proposed collection of information is necessary for the proper performance of the functions of the agency, including whether the information shall have practical utility; (b) the accuracy of the agency's estimate of the burden (including hours and cost) of the proposed collection of information; (c) ways to enhance the quality, utility, and clarity of the information to be collected; and (d) ways to minimize the burden of the collection of information on respondents, including through the use of automated collection techniques or other forms of information technology.

Comments submitted in response to this notice will be summarized and/or included in the request for OMB approval of this information collection; they also will become a matter of public record.

Dated: March 16, 2005.

Gwellnar Banks,

Management Analyst, Office of the Chief Information Officer.

[FR Doc. 05–5525 Filed 3–18–05; 8:45 am]

BILLING CODE 3510–22–P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

Proposed Information Collection; Comment Request; Pacific Islands Region Seabird-Fisheries Side-Setting Survey

AGENCY: National Oceanic and Atmospheric Administration (NOAA).

ACTION: Notice.

SUMMARY: The Department of Commerce, as part of its continuing effort to reduce paperwork and respondent burden, invites the general public and other Federal agencies to take this opportunity to comment on proposed and/or continuing information collections, as required by the Paperwork Reduction Act of 1995.

DATES: Written comments must be submitted on or before May 20, 2005.

ADDRESSES: Direct all written comments to Diana Hynek, Departmental Paperwork Clearance Officer, Department of Commerce, Room 6625, 14th and Constitution Avenue, NW., Washington, DC 20230 (or via the Internet at *dHynek@doc.gov*).

FOR FURTHER INFORMATION CONTACT: Requests for additional information or copies of the information collection instrument and instructions should be directed to Alvin Katekaru, (808) 973–2937 or *Alvin.Katekaru@noaa.gov.*

SUPPLEMENTARY INFORMATION:

I. Abstract

The Western Pacific Fishery Management Council is preparing mitigation measures to reduce interactions between seabirds and the Hawaii-based pelagic longline fishery, by requiring longline vessel operators to use either side-setting (setting the longline fishing gear from the side of the vessel rather than the stern) or the current suite of seabird mitigation measures, plus tori lines. Although side-setting shows to be the most promising mitigation technique in terms of effectiveness, additional information is needed. The vessel operators currently voluntarily side-setting will be asked to provide data on the operational benefits of side-setting as well as the effectiveness of side-setting as a seabird deterrent. This collection of information is intended to provide the National Marine Fisheries Service with information as to the cost, availability of equipment, and operational use of equipment, required for side-setting. This information will be used to determine whether it is feasible and cost effective for Hawaii longline vessels to convert to side setting, and to formulate specifications for vessels side-setting.

II. Method of Collection

Paper surveys administered and completed by staff in interviews conducted dockside with participants.

III. Data

OMB Number: None.
Form Number: None.
Type of Review: Regular submission.
Affected Public: Business or other for-profits organizations, and individuals or households.
Estimated Number of Respondents: 120.
Estimated Time Per Response: 30 minutes.
Estimated Total Annual Burden Hours: 60.
Estimated Total Annual Cost to Public: $0.

IV. Request for Comments

Comments are invited on: (a) Whether the proposed collection of information is necessary for the proper performance of the functions of the agency, including whether the information shall have practical utility; (b) the accuracy of the agency's estimate of the burden (including hours and cost) of the proposed collection of information; (c) ways to enhance the quality, utility, and clarity of the information to be collected; and (d) ways to minimize the burden of the collection of information on respondents, including through the use of automated collection techniques or other forms of information technology.

Comments submitted in response to this notice will be summarized and/or included in the request for OMB approval of this information collection; they also will become a matter of public record.

Dated: March 16, 2005.

Gwellnar Banks,

Management Analyst, Office of the Chief Information Officer.

[FR Doc. 05–5526 Filed 3–18–05; 8:45 am]

BILLING CODE 3510–22–P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

[I.D. 020405A]

Small Takes of Marine Mammals Incidental to Specified Activities; Marine Seismic Survey off the Aleutian Islands in the North Pacific Ocean

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice of receipt of application and proposed incidental take authorization; request for comments.

SUMMARY: NMFS has received an application from the Lamont-Doherty Earth Observatory (L-DEO), a part of Columbia University, for an Incidental Harassment Authorization (IHA) to take small numbers of marine mammals, by harassment, incidental to conducting a low-energy, shallow-penetrating seismic survey and scientific rock dredging program around the Aleutian Islands. Under the Marine Mammal Protection Act (MMPA), NMFS is requesting comments on its proposal to issue an authorization to L-DEO to incidentally take, by harassment, small numbers of several species of cetaceans and pinnipeds for a limited period of time within the next year.

DATES: Comments and information must be received no later than April 20, 2005.

ADDRESSES: Comments on the application should be addressed to Steve Leathery, Chief, Permits, Conservation and Education Division, Office of Protected Resources, National Marine Fisheries Service, 1315 East-West Highway, Silver Spring, MD 20910–3225, or by telephoning the contact listed here. The mailbox address for providing email comments is *PR1.020405A@noaa.gov*. Please include in the subject line of the e-mail comment the following document identifier: 020405A. NMFS is not responsible for e-mail comments sent to addresses other than the one provided here. Comments sent via e-mail, including all attachments, must not exceed a 10–megabyte file size. A copy of the application containing a list of the references used in this document may be obtained by writing to this address or by telephoning the contact listed here and is also available at: *http://www.nmfs.noaa.gov/prot_res/PR2/Small_Take/smalltake_info.htm#applications.*

FOR FURTHER INFORMATION CONTACT: Kenneth Hollingshead, Office of Protected Resources, NMFS, (301) 713–2289, ext 128.

SUPPLEMENTARY INFORMATION:

Background

Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq.*) direct the Secretary of Commerce to allow, upon request, the incidental, but not intentional, taking of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and either regulations are issued or, if the taking is limited to harassment, a notice of a proposed authorization is provided to the public for review.

Permission may be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s), will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses, and that the permissible methods of taking and requirements pertaining to the monitoring and reporting of such takings are set forth. NMFS has defined ''negligible impact'' in 50 CFR 216.103 as ''...an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.''

Section 101(a)(5)(D) of the MMPA established an expedited process by which citizens of the United States can apply for an authorization to incidentally take small numbers of marine mammals by harassment. Except with respect to certain activities not pertinent here, the MMPA defines ''harassment'' as: